

**Ind 51.01 Mill construction.** (1) In a building of mill construction the structural frame shall consist of steel or iron which shall be fire-protected, of reinforced concrete, of masonry, or of heavy timbers, except that in buildings not exceeding one story in height the structural steel or iron may have the fire-protection omitted.

(2) Exterior and court walls shall be 2-hour fire-resistive construction as specified in section Ind 51.05, except that non-load bearing exterior walls which face streets, alleys, outer or inner courts 20 feet or more in width may be constructed of incombustible panels of not less than 1-hour fire-resistive construction.

(a) Non-load bearing exterior walls which face streets, alleys, outer or inner courts 30 feet or more in width may be constructed of incombustible panels with no fire-resistive rating.

(3) All wood columns in the structural frame shall be directly superimposed, one above the other, and shall be provided with steel or cast iron caps, unless the floor or roof beams and girders are carried on blocks securely fastened to the columns and with the loads transmitted to the columns by metal ring or similar type connectors or by caps of otherwise suitable material. They shall not rest on wood bolsters or floor timbers. Wood bolsters may be used to support roof timbers. No wood column shall be less than 8 inches nominal in its least dimension, and no beam, girder or joist shall be less than 6 inches nominal in its least dimension nor less than 45 square inches in cross-sectional area. Where wood arches or wood trusses are used to support roof loads, the framing members shall not be less than 4 inches by 6 inches, nominal dimensions. In no case shall masonry or reinforced concrete be supported on wood construction except tile or concrete floor finishes not more than 3 inches in thickness.

(4) For structural steel or iron members, the fire-protection shall be not less than 3-hour fire-resistive protection for columns and not less than 2-hour fire-resistive protection for beams, girders and floor systems, as specified in section Ind 51.04.

(5) All reinforcement in concrete columns shall be fire-protected with not less than 3-hour fire-resistive protection, and all joists, beams, girders, slabs and steel floors with not less than 2-hour fire-resistive protection outside of all steel reinforcing as specified in section Ind 51.04.

(6) Wood floor construction shall be of tongues and grooves, or splined lumber not less than 3 inches nominal thickness, with a top layer of flooring of one inch nominal thickness laid thereon, or of solid lumber placed on edge and securely spiked together to make a floor not less than 4 inches nominal thickness.

(7) Roof construction shall be as specified for floors, except that the minimum nominal thickness shall be 2 inches. Roof coverings shall be a fire-retardant roofing as specified in section Ind 51.07 and shall be required over all combustible roof construction.

(8) Enclosures for elevator or dumbwaiter shafts, vent shafts, stair wells, wastepaper chutes, and other similar vertical shafts shall be of 2-hour fire-resistive construction as specified in section Ind 51.05, with all interior openings therein protected by fire-resistive doors as specified in section Ind 51.09.

(9) Stair construction may be of wood in buildings not exceeding 3 stories in height. In buildings 4 or more stories in height all stairs and stair construction shall be as required for fire-resistive construction specified in section Ind 51.001.

(10) Doors and windows may be of wood except as otherwise specified under occupancy requirements in this code.

**History:** 1-2-56; am. (2); (2) (a); Register, June, 1956, No. 6, eff. 7-1-56; r. and recr. Register, September, 1959, No. 45, eff. 10-1-59.

**Ind 51.02 Ordinary construction.** (1) A building is of ordinary construction if all enclosing walls are constructed entirely of incombustible material, and the roof has a fire-retardant covering as specified in section Ind 51.07.

(2) The interior structural framework shall be of steel, iron, reinforced concrete, masonry, or wood. Fire protection of steel, iron or wood structural members may be omitted, except that all members carrying masonry in buildings more than one story in height shall be fire protected with not less than one-hour protection as specified in section Ind 51.04.

(3) Floors, roof and partitions may be of wood but no joist, rafter, or stud shall be less than 2 inches in nominal thickness. In buildings of 4 stories or more in height, the lower side of all metal or wood floor or roof construction shall be protected by a ceiling of one-hour fire-resistive construction as specified in section Ind 51.06, unless otherwise provided under the occupancy requirements.

(4) Stairs may be of steel, iron, reinforced concrete, masonry or wood, with enclosures as specified under occupancy requirements.

(5) Bays, oriels and similar projections from the walls shall be constructed of incombustible materials as specified in this section. Penthouses and other roof structures shall be of not less than one-hour fire-resistive construction as specified in section Ind 51.06.

**History:** 1-2-56; r. and recr. Register, September, 1959, No. 45, eff. 10-1-59.

**Ind 51.03 Frame construction.** (1) A building is of frame construction if the structural parts and enclosing walls are of wood, or of wood in combination with other materials. If such enclosing walls are veneered, encased or faced with stone, brick, tile, concrete, plaster or metal, the building is also termed a frame building.

**Ind 51.04 Fire-resistive standards; structural members.** (1) MINIMUM THICKNESS IN INCHES FOR VARIOUS FIRE-RESISTIVE MATERIALS

(3) The industrial commission will accept roof coverings for different fire-resistance values as established by, and if installed according to, the requirements of the Underwriters' Laboratories.

*Note:* The Underwriters' Laboratories "List of Inspected Materials" is obtainable from the Fire Insurance Rating Bureau and Fire Insurance Agencies.

(4) The industrial commission will approve, subject to the provisions of this section, any roof covering which has developed the required fire-resistance in tests as specified in the "Standard Specifications of Fire Tests of Building Construction and Materials" (A.S.T.M. Designation C19-33) when conducted by a nationally recognized testing laboratory.

**Ind 51.08 Occupancy separations.** (1) When a building is used for more than one occupancy purpose, each part of the building comprising a distinct occupancy division shall be separated from any other occupancy division as provided for under the occupancy requirements of this code.

(2) Occupancy separations shall be classed as "Absolute", "Special" and "Ordinary" and shall apply to both horizontal and vertical separations.

(a) An absolute occupancy separation shall have no openings therein and shall be of not less than 4-hour fire-resistive construction as specified in sections Ind 51.05 and Ind 51.06.

(b) A special occupancy separation shall be of not less than 3-hour fire-resistive construction as specified in sections Ind 51.05 and Ind 51.06. All openings in walls forming such separation shall be protected on each side thereof by self-closing fire-resistive doors as specified in section Ind 51.09, and such doors shall be kept normally closed. The total width of all openings in any such separating wall in any one story shall not exceed 25% of the length of the wall in that story and no single opening shall have an area greater than 120 square feet.

1. All openings in floors forming this type of separation shall be protected by vertical enclosures extending above and below such openings. The walls of such vertical enclosures shall be of not less than 2-hour fire-resistive construction as specified in section Ind 51.05 and all openings therein shall be protected on one side thereof by self-closing one-hour fire-resistive doors as specified in section Ind 51.09 and such doors shall be kept normally closed.

(c) An ordinary occupancy separation shall be of not less than one-hour fire-resistive construction as specified in sections Ind 51.05 and Ind 51.06. All openings in such separations shall be protected by self-closing fire-resistive doors as specified in section Ind 51.001 and such doors shall be kept normally closed.

**Ind 51.09 Fire-resistive doors.** (1) Fire-resistive doors have no time resistance rating established by governmental agencies. It will be the policy of the industrial commission to approve, subject to the provisions of this section, any door given a rating by the Underwriters' Laboratories in their "Building Materials List" as Class A, B, C, D and E having varying degrees of resistance, and suitable for various locations.

(2) Where fire-resistive doors are required, class A doors, or equal, shall be used for all openings in 3 and 4 hour fire-resistive walls.

Class B doors, or equal, shall be used for all openings in 2-hour walls. Doors for elevator shafts shall be of class B type or equal. Class C doors, or equal, shall be used in openings in corridor partitions in fire-resistive buildings and for openings in one-hour fire-resistive partitions except that wood doors of solid flush type, 1¾ inches thick may be used in such buildings which are less than 85 feet in height. Class D and E doors, or better, shall be used in outside wall openings where required for fire escapes.

*Note:* The Underwriters' Laboratories Fire Protection Equipment List is obtainable from the Fire Insurance Rating Bureau and fire insurance companies.

*History:* 1-2-56; r. and recr. Register, September, 1959, No. 45, eff. 10-1-59.

**Ind 51.10 Fire resistive windows.** (1) Windows shall be of a design approved by the industrial commission for the intended use as provided under occupancy classifications. The term "window" in this order shall include the frame, sash and all other parts of a complete assembly. Approved wired glass ¼ inch in thickness shall be used for glazing.

(2) Windows shall be limited to sizes for which effective fire-resistance has been demonstrated by actual fire test, and which in no case exceed 84 square feet in area and 12 feet in greatest dimension. Such windows may be combined in multiple assemblies when separated by approved metal mullions, which shall be considered non-bearing.

(3) Individual glass lights shall not exceed 720 square inches in area, and 54 inches in vertical and 48 inches in horizontal dimension.

*Note:* It will be the policy of the industrial commission to approve, subject to the provisions of this order, any window bearing the inspection manifest of the Underwriters' Laboratories for the situation of installation.

**Ind 51.11 Glass block.** (1) **USE.** Approved glass block may be used in non-load bearing panels in walls where ordinary glass will be permitted, unless specifically prohibited by occupancy requirements of this code.

(2) **INSTALLATION.** Glass block panels shall not exceed 144 square feet in unsupported area, with a maximum height of 20 feet and a maximum width of 20 feet. The horizontal and vertical mortar joints between each block shall be composed of one part of Portland cement, one part of lime and 4 parts of sand, or its equivalent.

(a) All panels over 6 feet in width shall be supported on each side by chases, not less than 1½ inches in depth, of metal or other incombustible material.

(b) Approved continuous metal bond ties shall be provided in each horizontal mortar joint for block of nominal 12 x 12 inch size and in at least every third joint for block of smaller dimension.

(c) Provision shall be made in all panels for expansion, using approved expansion material not less than ½ inch thick for heads and lintels and not less than ¼ inch thick for jambs.

**Ind 51.12 Height of building.** The height of a building is measured at the center line of its principal front, from the sidewalk grade (or, if setting back from the sidewalk, from the grade of the ground adjoining the building) to the highest part of the roof, if a flat roof, or to a point 2/3 of the height of the roof, if a gabled or hipped roof. If the grade of the lot or adjoining sidewalk in the rear or alongside

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of the building falls below the grade at the front, the height shall be measured at the center of the lowest side.

**Ind 51.13 Basement; first floor; number of stories.** A basement is a story whose floorline is below grade at any entrance or exit and whose ceiling is not more than 5 feet above grade at any such entrance or exit. The first floor is the floor next above the basement, or the lowest floor if there is no basement. The number of stories of a building includes all stories except the basement.

**Ind 51.14 Street; alley; court.** (1) A street is any public thoroughfare 30 feet or more in width.

(2) An alley is any public thoroughfare less than 30 feet, but not less than 10 feet, in width.

(3) A court is an open, unoccupied space other than a street or alley and bounded on one or more sides by the walls of a building.

**Ind 51.15 Standard exit.** (1) Every door which serves as a required exit from a public passageway, stairway or building shall be a standard exit door unless exempted by the occupancy requirements of this code.

*Note:* For required exits see sections Ind 54.06, 55.10, 56.08, 57.09.

(2) Every standard exit door shall swing outward or toward the natural means of egress (except as below). It shall be level with the floor, and shall be so hung that, when open, it will not block any part of the required width of any other doorway, passageway, stairway or fire escape. No revolving door, and no sliding door except where it opens onto a stairway enclosure or serves as a horizontal exit, shall be considered as a standard exit door.

(3) A standard exit door shall have such fastenings or hardware that it can be opened from the inside without using a key, by pushing against a single bar or plate, or turning a single knob or handle; it shall not be locked, barred, or bolted at any time while the building is occupied.

(4) A standard exit doorway shall not be less than 6 feet 4 inches high by 3 feet 4 inches wide, except where especially provided under occupancy classifications and in section Ind 51.20. Where double doors are provided with or without mullions, the width of each single door may be reduced to 2 feet 6 inches.

(5) In every building which is used at night, a red exit light shall be placed over every emergency exit door and also over every exit door where other doors or openings may cause confusion.

(6) Doors, windows or other openings which are not exits but which give the appearance of exits shall be effectively guarded.

**Ind 51.16 Stairways.** (1) **DEFINITION.** By a stairway is meant one or more flights of steps and the necessary platforms connecting them to form a continuous passage from one level to another within a building or structure, except as provided in (3) (b).

(2) **WIDTH.** Every required exit stairway, whether enclosed or not, shall be not less than 3 feet 8 inches wide of which not more than 4 inches on each side may be occupied by a handrail. Every platform shall be at least as wide as the stairway, measuring at right angles to the direction of travel. Every straight run platform shall measure at least 3 feet in the direction of travel. Wherever a door opens onto a stairway, a platform shall be provided extending at least the full width of the door in the direction of travel. *Exception:*

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(a) In apartment buildings not more than 2 stories in height and having not more than 2 apartments on a floor and in rooming houses, hospitals, hotels and similar buildings not more than 2 stories in height and having not more than 6 living or sleeping rooms on a floor, such stairways shall not be less than 3 feet wide.

(b) If other stairways are provided in addition to those required by this code, such additional stairways need not conform to the width requirements of this code.

(3) **HANDRAILS.** All stairways and steps of more than 3 risers shall have at least one handrail. Stairways and steps 5 feet or more in width, or open on both sides, shall have a handrail on each side. Stairways and steps which are less than 5 feet in width shall have a handrail on the left hand side as one mounts the stairs and on the open side, if any.

(a) Stairways which are more than 8 feet wide shall be divided by center rails into widths not more than 8 feet nor less than 3 feet 8 inches. Rails shall be not less than 2 feet 6 inches above the nose of the treads or 3 feet 6 inches above the platform except as specified in section Ind 51.20. Railings on the open sides of stairways and platforms shall be provided with an intermediate member at midheight or with vertical members having a maximum spacing of 11 inches, or its equivalent in safety.

(b) Stairways on the outside of buildings and an integral part thereof, having more than 3 risers, shall have a handrail at each side, and if the stairway is more than 50 feet wide, one or more intermediate handrails shall be provided.

(c) Where an exit door leads to an outside stairway, platform or sidewalk, the level of the platform or sidewalk shall not be more than 7 $\frac{3}{4}$  inches below the door sill except as provided in section Ind 51.20 (4) (g).

(4) **RISERS AND TREADS.** All stairways and steps required as exits by this code shall have a uniform rise of not more than 7 $\frac{3}{4}$  inches and a uniform tread of not less than 9 $\frac{1}{2}$  inches, measuring from tread to tread, and from riser to riser. No winders shall be used. There shall not be more than 18, nor less than 3 risers between platforms or between floor and platform and not more than 22 risers from floor to floor with no platform.

(a) Stairways and steps not required as exits by this code shall have a uniform rise of not more than 8 inches and a uniform tread of not less than 9 inches. If winders are used, the tread shall be at least 7 inches wide at a point one foot from the narrow end.

(b) For stairways to elevated walks, platforms and runways in places of employment see section Ind 1.17 of the general orders on safety issued by the industrial commission.

(c) The edges of all treads and the edges of all stairway landings shall be finished with a non-slippery surface not less than 3 inches in width.

**History:** 1-2-56; am. (2); (2) (a); (2) (b); Register, June, 1956, No. 6, eff. 7-1-56; r. and recr. Register, September, 1959, No. 45, eff. 10-1-59.

**Ind 51.17 Smokeproof stair tower.** (1) A smokeproof stair tower shall be an enclosed stairway which is entirely cut off from the building and which is reached by means of open balconies or platforms. The stairways, landings, platforms and balconies shall be of incombustible material throughout. The enclosing walls shall be of not

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marble, slate, monolithic asphalt or other approved material impervious to water.

**Ind 52.58 Walls and ceilings.** (1) The walls and ceilings of every toilet room shall be completely covered with smooth plaster, galvanized or enameled metal, gypsum wallboard  $\frac{5}{8}$  inch in thickness with taped joints, or constructed of brick, tile or other masonry units with flush joints or other equivalent smooth, non-absorbent material. Wood may be used only if it is smooth and well covered with 2 coats of body paint and one coat of enamel paint or spar varnish. Wood shall not be used for partitions between toilet rooms nor for partitions which separate a toilet room from any room used by the opposite sex. All such partitions shall be made soundproof. This is not intended to prohibit the use of wood stud partitions between rooms if partitions are lathed and plastered on both sides.

(2) The interior surface of walls and partitions shall be of light color to improve illumination and facilitate cleaning.

**History:** 1-2-56; r. and recr. Register, September, 1959, No. 45, eff. 10-1-59.

**Ind 52.59 Enclosure of fixtures.** (1) The fixtures (closets and urinals) in every toilet room shall be arranged to secure privacy in use. Water-closets shall be enclosed with partitions. Urinals shall be placed against walls and arranged individually. Individual floor type urinals shall be placed not less than 24 inches center to center and the space between urinals shall be filled flush with the front and top with non-absorbent material. *Exception:*

(a) The above requirements need not apply to toilet rooms accommodating only a single closet or urinal.

(2) A space of 6 to 12 inches shall be left between the floor and the bottom of each partition. The top of the partition shall be from  $5\frac{1}{2}$  to 6 feet above the floor. Doors with the top  $5\frac{1}{2}$  to 6 feet above the floor, and the bottom 6 to 12 inches above the floor, shall be provided for all water-closet compartments. All partitions and doors shall be of material and finish required for walls and ceilings under section Ind 52.58.

(3) The water-closet compartments in toilet rooms shall be not less than 30 inches in width, and shall be not less than 54 inches in depth with a clearance of not less than 24 inches between the fixture and the compartment door when closed. Compartment doors which are hung to swing inward shall clear the fixture not less than 2 inches.

**Note:** Section 146.085, Wis. Stats., provides that not more than 50% of the toilet compartments of any public toilet room of any public building, other than licensed hotels and resorts, shall be kept locked.

**Ind 52.60 Fixtures.** (1) Only individual water closets of porcelain or vitreous china shall be used. Water closet seats shall be of wood or other non-heat absorbing material, and shall have a finished surface that is impervious to water or cleaning agents. In public buildings, places of employment, and all other public places except apartments, and guest rooms in hotels and motels, the water closets shall have elongated bowls. All water closets except in apartments shall have open front seats without cover.

(2) Only individual urinals of porcelain, vitreous china, or stainless steel shall be used. Such urinals shall be set into the floor, the floor graded to the urinal and the urinals shall be equipped with an effective automatic or foot operated flushing device.

**History:** 1-2-56; r. and recr. Register, September, 1959, No. 45, eff. 10-1-59.

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**Ind 52.61 Protection from freezing.** All water-closets and urinals and the pipes connecting therewith shall be properly protected against freezing, so that such water-closets and urinals will be in proper condition for use at all times.

**Ind 52.62 Disposal of sewage.** (1) Each water-closet and urinal, and each lavatory or slop sink, located in a toilet room shall be connected with a sewer and water system, where such systems are available. In locations where a sewer system is not available, or cannot be made available, the disposal of human waste may be accomplished as follows:

(a) Sewage treatment tank and disposal system.

*Note:* For detailed requirements on such systems see state plumbing code.

(b) Where the local conditions make it impractical to install such system, outdoor toilets, as described in section Ind 52.63, or other facilities, such as septic toilets installed in accordance with the provisions of the septic toilet code issued by the state board of health, may be used; provided that in the case of places of employment for more than 10 persons, schools larger than 2 rooms, and apartment houses, water flush toilets as herein described shall be provided, unless outdoor toilets or other facilities are permitted in writing by the industrial commission or the state board of health. In every case where chemical or septic toilets are installed, the approval of plans and specifications therefor by the state board of health shall be secured before work is started.

**Ind 52.63 Outdoor toilets.** (1) Outdoor toilets shall comply with sections Ind 52.50 to Ind 52.59, inclusive, and in addition:

(a) No privy, with or without a leaching pit or other container, shall be erected or maintained within 50 feet of any well, 10 feet of the line of any street or other public thoroughfare, 5 feet of the property line between premises or 25 feet of the door or window of any building.

(b) Located on ground that is well drained, and where there is no possibility of contaminating any drinking water supply.

(c) Provided with suitable approach, such as concrete, gravel or cinder walk.

(d) The foundations shall be of concrete or other masonry.

(e) The vault shall extend at least 6 inches above ground, be as dark as possible, and be proof against entrance by flies, rats, or other vermin. The upper portion shall be of concrete, or of brick or stone laid in cement mortar. If in poorly drained soil, the entire vault shall be of concrete, or brick, or stone, laid in cement mortar.

(f) All windows, ventilators and other openings shall be screened to prevent the entrance of flies, and all doors shall be self-closing. A separate ventilator shall be provided for the vault and shall extend from the vault to not less than one foot above the roof and be provided with an effective ventilating hood.

(g) The entire installation shall be kept clean and sanitary. Milk of lime (freshly slaked lime) or other equally effective disinfectant shall be used in the vault and in the urinal trough in sufficient quantities, and at frequent intervals. The floors, seats and urinals shall be scrubbed as often as necessary. The vault shall be cleaned out at proper intervals.

*Note:* See the Wisconsin code for rural school privies issued by the state board of health.

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(a) In lime or lime-cement mortars any desired part of the lime may be replaced with an equal volume of Portland cement.

(5) Cement mortar shall consist of one part of Portland cement and not more than 3 parts of approved sand, except that lime putty, or dry hydrated lime, in volume equal to not more than 15% of the volume of Portland cement may be added to the mortar.

*Note:* Approved sand for mortar shall conform to the Tentative Specifications for Concrete Aggregates (A.S.T.M. Designation C33-40) of the American Society for Testing Materials.

**Ind 53.09 Bearing masonry walls, bearing partitions and piers. (1) GENERAL REQUIREMENTS.** All masonry units used in the construction of bearing walls, bearing partitions and piers shall conform in all respects to the requirements for bearing units.

(2) **UNIT STRESSES.** The unit stresses in bearing masonry walls, partitions and piers shall not exceed those specified in sections Ind 53.04 and Ind 53.07.

(3) **MORTARS.** Cement mortar shall be used for all masonry which will have one or more faces in contact with soil. Lime-cement mortar or cement mortar shall be used for all masonry in isolated piers, parapet walls, chimneys where exposed to the weather, and for all hollow masonry units. All other masonry may be laid in cement mortar, lime-cement mortar or lime mortar.

(4) **MASONRY BOND.** In brick masonry, or in combination brick and other masonry units, the bonding of each tier of units to that adjoining shall be secured by means of a full header course of brick every sixth course of brick, or equivalent. The use of metal ties for bonding masonry is not approved.

(a) By equivalent, is meant that 1/6 of the surface of a wall shall be header, or bond, units.

(b) Where masonry units are larger or smaller than brick, the bond courses shall be placed at intervals not exceeding 16 inches.

(c) **Stack bond.** Stack bonded masonry units used in the construction of bearing walls and partitions shall be bonded with 3/16 inch diameter steel rods or metal ties of equivalent stiffness embedded in the mortar joints. The vertical distance between ties shall not exceed 16 inches.

(5) **USE OF HOLLOW CLAY TILE AND HOLLOW CONCRETE MASONRY UNITS.** Approved clay tile and concrete masonry units may be used in bearing and exterior walls of buildings not more than 3 stories, or 45 feet in height, or in panel walls in buildings of any height. In determining this height, the basement or foundation wall shall be considered a story if constructed of clay tile or concrete masonry units.

(6) **LOADING.** Concentrated loads shall be transmitted to hollow clay tile or hollow concrete block masonry by at least 3 courses of brick or equivalent concrete or by a metal plate of sufficient thickness and size to distribute the load to the webs and shells in such a manner as not to exceed the unit allowable stress.

(7) **PARTY WALL CONSTRUCTION.** Where hollow clay tile or hollow concrete masonry units are used in party walls, there shall be not less than 2 such units, each 8 inches in thickness as a minimum, used in making up the thickness of the wall unless solid masonry is used for

building all chases, recesses, framing of all openings, and for the support, anchorage, and protection of all joists and beams carried into such wall.

(8) **WALL CONSTRUCTION.** Clay tile and concrete masonry units used in bearing walls shall be well bedded in mortar. The net bearing area of all clay tile and concrete masonry units as laid in the wall shall be such that the allowable unit stress in the mortar is not exceeded.

(9) **SAME.** All clay tile laid with cells vertical shall be laid in Portland cement mortar. All clay tile laid with cells horizontal and all concrete masonry units shall be laid in cement-lime mortar, or better.

(10) **HEIGHT AND THICKNESS.** All bearing walls, party walls and standard division walls, except as hereinafter provided, shall be not less than 12 inches thick in the upper 3 stories, increasing 4 inches in thickness for each 3 stories, or fraction, below. No such 3 story height shall exceed 40 feet.

(11) **WALL THICKNESS.** A building not more than 3 stories in height may have 8 inch bearing walls in the upper story, provided such story is not more than 10 feet high in the clear, and the span is not more than 20 feet, and the wall is not more than 30 feet long between cross walls, offsets or pilasters.

(12) **SAME.** A building not more than one story in height may have 8 inch bearing walls, provided the clearstory height is not more than 12 feet, the roof span is not more than 25 feet, and the distance between cross walls, offsets or pilasters is not more than 20 feet.

(a) A building not more than one story in height may have 6-inch bearing walls provided the clearstory height is not more than 9 feet, the roof span is not more than 18 feet and the distance between cross walls, offsets, or pilasters is not more than 15 feet. All other 1-story buildings shall have all bearing walls not less than 12 inches thick.

(13) **LATERAL SUPPORT.** All bearing masonry walls shall have substantial lateral support at right angles to the wall face at intervals, measured either vertically or horizontally, not exceeding 18 times the wall thickness. Such lateral support shall be obtained by masonry cross walls, piers or buttresses when the limiting distance is measured horizontally, or by floors or roof when the limiting distance is measured vertically.

(14) **WALLS BELOW GRADE.** Masonry walls which are in contact with the soil in any story shall be increased 4 inches in thickness in that story, except that for places of abode as specified in section Ind 57.001, not over 2 stories in height, 12 inch walls will be accepted if substantial lateral supports consisting of masonry walls, offsets or pilasters are provided at intervals not to exceed 20 feet.

(15) **STONE WALLS.** Rubble and rough cut stone walls shall be 4 inches thicker than required for walls of artificially formed units or of ashlar masonry.

(16) **SAME.** Stone and similar solid facing not less than 4 inches thick may be considered as part of the required thickness of a wall if bonded to the backing as required for brickwork. No such wall shall be less than 12 inches thick.

(17) **PIERS.** In all buildings, the section of masonry supporting trusses or girders shall be considered as isolated piers, the least dimension of which, in inches, shall be not less than 1/30 of the span of the truss, or girder, in inches, and the height shall not exceed 12 times the minimum horizontal dimension.

(a) The height of masonry piers which are not built into, and as a part of bearing walls, shall be not more than 10 times the minimum horizontal dimension.

(b) Support for long span joist. Where long span steel joist or laminated structural wood members or precast concrete members are used on spans of more than 40 feet, and the spacing exceeds 4 feet, pilasters shall be provided to support each joist or spandrel beam supported on pilasters, or steel columns shall be provided to support the joist.

(18) **CHASES, RECESSES AND OPENINGS.** There shall be no chases in 8 inch walls or in any pier. No chase in any wall shall be deeper than 1/4 the wall thickness. No horizontal chase shall exceed 4 feet in length nor shall the horizontal projection of any diagonal chase exceed 4 feet. No vertical chase shall be closer than 2 feet to any pilaster, cross wall, end wall or other stiffener.

(a) The aggregate area of recesses and chases in the wall of any one story shall not exceed 1/4 the whole area of the face of the wall in that story. No chases or recesses shall be permitted in any wall which will reduce the fire resistance of such wall below the minimum required by this code.

(b) The maximum percentage of openings in the horizontal cross section of any wall shall not exceed 50%, unless the wall is increased 4 inches in thickness, or such portions of the wall between openings shall be as required for piers for the entire wall height.

**History:** 1-2-56; am. (12) (a), Register, June, 1956, No. 6, eff. 7-1-56; am. (4) (b), Register, August, 1957, No. 20, eff. 9-1-57; r. and recr. Register, September, 1959, No. 45, eff. 10-1-59.

**Ind 53.10 Non-bearing masonry walls. (1) GENERAL REQUIREMENTS.** All exterior non-bearing masonry walls if constructed with one course of brick to the weather may be backed with common brick, concrete masonry units, or non-bearing clay tile, conforming to the requirements of sections Ind 53.05 and Ind 53.06. If walls are built of concrete masonry units or clay tile, with or without exterior stucco, such walls shall be constructed of concrete masonry units or clay tile conforming to the requirements of section Ind 53.06.

(2) **INTERIOR NON-BEARING WALLS.** Interior non-bearing partition walls may be built of materials conforming to the requirements of sections Ind 53.05 and Ind 53.06, or of gypsum block or other approved materials.

(3) **TYPE OF MORTAR.** Lime, lime-cement or cement mortar shall be used for all non-bearing masonry, except as follows:

(a) Lime mortar shall not be used in normally wet or damp locations.

(b) Gypsum shall be used for gypsum masonry.

(c) Gypsum may be used for interior clay tile masonry.

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(4) **MASONRY BOND AND ANCHORAGE.** In non-load bearing brick masonry or in combinations of brick and other masonry units, the bonding of each tier of units to that adjoining, shall be secured by means of a full header course of brick or other units placed at intervals not exceeding 32 inches. The height of such bond course shall not exceed 5 inches and the width of bed joint used to effect the masonry bond shall be at least 4 inches.

(a) All exterior and interior non-bearing walls and partitions shall be securely anchored to supporting members by means of corrosion resistant ties of at least No. 13 U.S. Standard Gauge metal spaced not more than 18 inches center to center.

(b) **Stack bond.** Stack bonded masonry units used in the construction of non-load bearing walls and partitions shall be bonded with 3/16 inch steel rods or metal ties of equivalent stiffness embedded in the mortar joint. The vertical distance between ties shall not exceed 32 inches.

(c) **Masonry veneer on frame structures** shall be securely anchored to the structure with corrosion resistant ties of at least No. 13 U.S. Standard Gauge metal or equal. The maximum vertical distance between ties shall not exceed 18 inches and the maximum horizontal distance shall not exceed 36 inches and the ties in alternate courses shall be staggered.

(5) **HEIGHT AND THICKNESS.** Interior non-bearing masonry walls which are supported by fire-resistive construction and have tight contact with not less than 2-hour fire-resistive construction at the top, shall be not more than 36 times their thickness in clear height. Similar non-bearing walls which contact less than 2-hour fire-resistive support at the top shall be not more than 24 times their thickness in clear height. Plastering shall be included in computing the thickness.

(6) **THICKNESS OF EXTERIOR NON-BEARING WALLS.** The thickness of exterior non-bearing walls shall be not less than 1/24 of the clear height and not less than 1/30 of the horizontal distance between vertical supports, but in no case less than 8 inches.

**History:** 1-2-56; r. and rec. Register, September, 1959, No. 45, eff. 10-1-59.

**Ind 53.11 Cavity walls.** (1) Exterior non-bearing walls may be built with a facing of 4 inches of building brick complying with the requirements of section Ind 53.05, and a backing of either building brick complying with the requirements of section Ind 53.05, or hollow building units complying with the requirements of section Ind 53.06. Such walls shall have an air space between the facing and backing of not less than 2 inches nor more than 2½ inches, and shall be bonded to each other with galvanized metal ties at least ¼ inch thick every 16 inches in height and 24 inches in width. The maximum height between supports shall be 10 feet. For heights greater than 10 feet between supports, the thickness of the backing shall be increased 2 inches for each 5 feet, or fraction thereof. The wall shall be anchored to the supporting framework with metal ties at least ¼ inch thick, spaced not more than 24 inches center to center.

(2) A waterproofing membrane shall be installed at the bottom of the wall cavity. It shall pass through both the exterior facing course and the backing in such a manner as to drain outward the water

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which might penetrate the facing. Open vertical joints, or weep holes, shall be provided every 3 feet horizontally in the facing above the membrane.

**Ind 53.12 Bonding and anchoring stone and cast stone veneers.** (1) For bearing walls, stone shall be bonded to the backing every 16 inches of wall height with bond courses at least 4 inches in height, and the width of bed joint used to effect the masonry bond shall be at least 4 inches.

(2) For non-bearing walls, individual stones shall be anchored to the supporting framework and dowelled to each other at all horizontal joints, and anchored to the backing at all horizontal joints and at vertical joints so that one anchor is provided for every 6 square feet of wall surface. All anchors shall be not less than  $\frac{1}{4}$  square inch in cross section and made of wrought iron galvanized after forming, or of commercial bronze.

(3) The backing of all stone or cast stone bearing or non-bearing walls shall be of brick conforming to the requirements of section Ind 53.05 or other solid material weighing at least 130 pounds per cubic foot except where the stone facing is not more than 4 inches in thickness, the backing may be of hollow masonry units conforming to the requirements of section Ind 53.06, or other similar non-corrosive material.

**History:** 1-2-56; r. and recr. Register, September, 1959, No. 45, eff. 10-1-59.

**Ind 53.13 Parapet walls.** (1) Parapet walls not less than 8 inches in thickness and 2 feet in height shall be provided on all exterior, division and party walls of masonry or concrete, where such walls connect with roofs other than roofs of fire-resistive construction; but this section shall not apply:



(3) ALLOWABLE UNIT STRESSES IN CONCRETE.

Description	Allowable unit stresses				
	For any strength of concrete in accordance with Section Ind 53.15(2) 30,000 $n = \frac{f'_c}{f_c}$	Maximum value psi	For strength of concrete shown below		
			$f'_c = 2000$ psi $n = 15$	$f'_c = 2500$ psi $n = 12$	$f'_c = 3000$ psi $n = 10$
<b>Flexure: <math>f_c</math></b>					
Extreme fiber stress in compression.....	$f_c$	$0.45f'_c$	900	1125	1350
Extreme fiber stress in tension in plain concrete footings.....	$f_c$	$0.03f'_c$	60	75	90
<b>Shear: <math>v</math> (as a measure of diagonal tension)</b>					
Beams with no web reinforcement.....	$v_c$	$0.03f'_c$	60	75	90
Beams with properly designed web reinforcement.....	$v$	$0.12f'_c$	240	300	360
Flat slabs at distance $d$ from edge of column capital or drop panel.....	$v_c$	$0.03f'_c$	60	75	90
Footings.....	$v_c$	$0.03f'_c$	75	75	75
<b>Bond: <math>u</math></b>					
Deformed bars					
Top bars.....		$0.07f'_c$	245	140	175
In 2-way footings (except top bars).....		$0.08f'_c$	280	160	200
All others.....		$0.10f'_c$	350	200	250
Plain bars (must be hooked)					
Top bars.....		$0.03f'_c$	105	60	75
In 2-way footings (except top bars).....		$0.036f'_c$	126	72	90
All others.....		$0.045f'_c$	158	90	113
<b>Bearing: <math>f_c</math></b>					
Walls, Piers, Pilasters and Pedestals					
On full area.....	$f_c$	$0.25f'_c$	500	625	750
On $\frac{1}{2}$ area or less.....	$f_c$	$0.375f'_c$	750	938	1125
Columns: See section Ind 53.19					

(4) ALLOWABLE UNIT STRESSES IN REINFORCEMENT. (a) Tension in longitudinal steel and web reinforcement:

- Structural grade steel rods .....  $f_s = 18,000$
- Intermediate grade and hard steel rods (Billet steel, rail steel or axle steel) .....  $f_s = 20,000$

(b) Compression in column verticals:

- 1. Intermediate grade steel rods .....  $f_s = 16,000$
- 2. Hard grade steel rods (Billet steel, rail steel or axle steel) .....  $f_s = 20,000$

3. The symbols and notation used in the above formulas are defined as follows:

- $f'_c$ —ultimate compressive strength of concrete at age of 28 days.
- $f_c$ —compressive unit stress in extreme fibre of concrete in flexure or axial compression in concrete in columns.
- $v_c$ —unit shearing stress in concrete.
- $u$ —bond stress per unit area of surface of bar.
- $f_s$ —tensile unit stress in reinforcement.

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(5) **ULTIMATE STRENGTH METHOD OF DESIGN.** (a) The ultimate strength method of design for reinforced concrete may be used under the following conditions if approved in writing by the industrial commission.

1. Where the ultimate strength method of design is used, all other features of the design shall conform to the requirements of the building code.

2. Positive control shall be provided for the concrete mix. This includes periodic tests of regular concrete cylinders to determine the strength of the concrete.

3. Supervision shall be provided by the supervising architect or engineer during mixing and pouring operations where this method of design is involved.

History: 1-2-56; cr. (5), Register, September, 1959, No. 45 eff. 10-1-59.

**Ind 53.23 Reinforced gypsum concrete.** (1) **MATERIALS.** (a) The term "gypsum" as used in this chapter shall mean calcined gypsum manufactured from gypsum meeting the requirements of the American Society for Testing Materials' Standard Specifications for Gypsum C22-25, (American Standard A49.1-1933).

(b) Gypsum concrete shall consist of a mixture of gypsum and water, with or without wood chips, fiber or other approved aggregate.

(c) Precast gypsum concrete shall contain not more than 3% and cast-in-place gypsum concrete not more than 12½% of wood chips, shavings, or fiber measured as a percentage by weight of the dry mix.

(d) Wood chips, shavings, or fiber used in gypsum concrete shall be dry, soft wood, uniform and clean in appearance. They shall pass a 1-inch screen and shall be not more than ¼ inch in thickness.

(e) Steel bar and wire reinforcing shall meet the requirements of section Ind 53.14 (5).

(2) **MINIMUM THICKNESS.** (a) The minimum thickness of gypsum concrete in floors and roofs shall be 2 inches except the suspension system, which shall be not less than 3 inches thick. Hollow precast gypsum concrete units for roof construction shall be not less than 3 inches thick and the shell not less than ½ inch thick.

(b) Precast gypsum concrete units for floor and roof construction shall be reinforced and unless the shape or marking of the unit is such as to insure its being placed right side up, the reinforcing shall be symmetrical so that the unit can support its load either side up.

(3) **DESIGN.** (a) Reinforced gypsum concrete shall be designed by methods admitting of rational analysis according to established principles of mechanics, to support the loads and withstand the forces to which it is subject without exceeding the stresses allowed in this chapter for the materials thereof except as hereinafter provided. The general assumptions and principles established for reinforced concrete shall also apply to reinforced gypsum concrete insofar as they are pertinent.

(b) For precast gypsum structural units which can not be analyzed in accordance with established principles of mechanics, the safe uniformly distributed carrying capacity shall be taken as ½ of the

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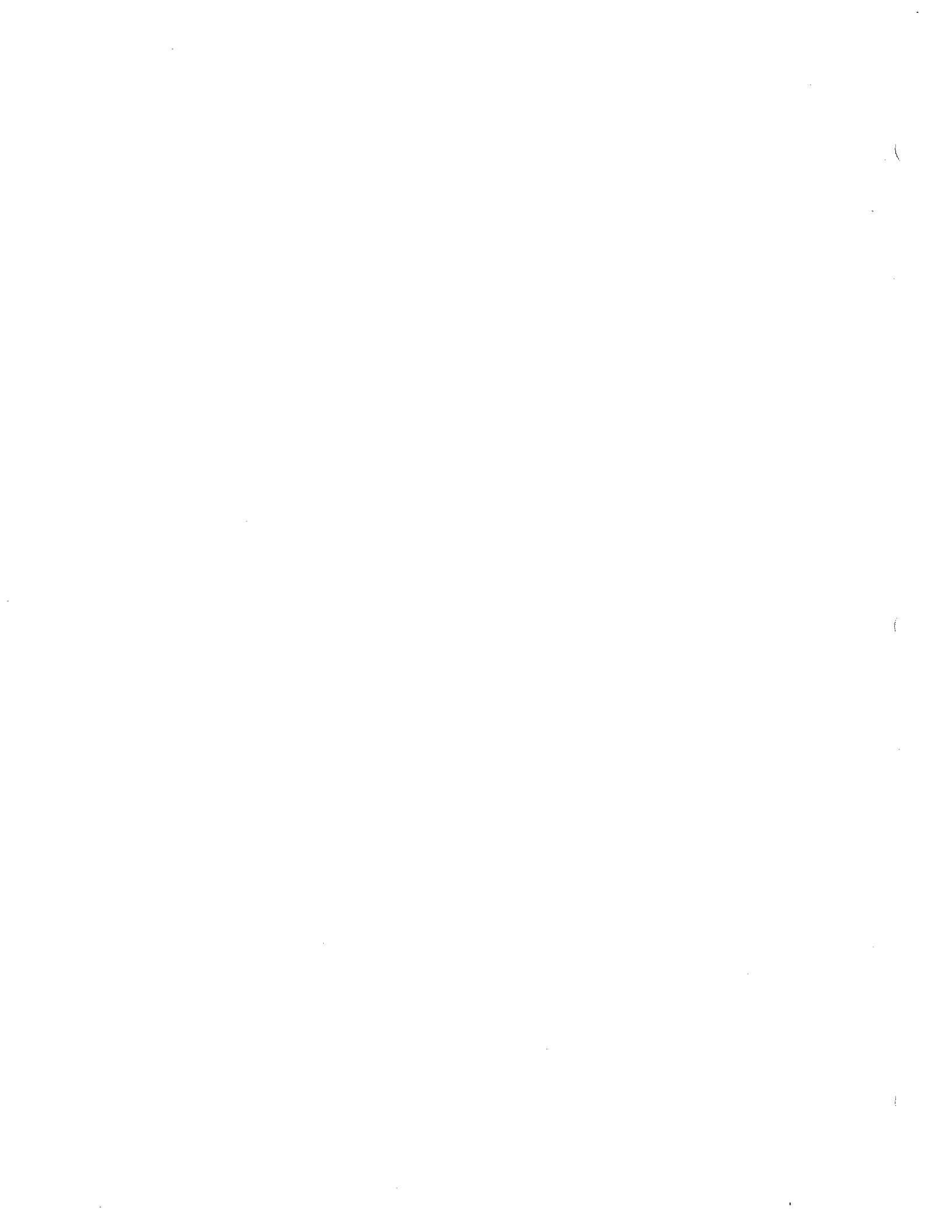


total load causing failure in a full size test panel with the load applied along 2 lines each distant  $\frac{1}{4}$  of the clear span from the support.

(c) Reinforced gypsum concrete shall not be used where exposed directly to the weather or where subjected to frequent or continuous wetting.

(4) STRENGTH. (a) Gypsum concrete shall be classified according to mixture, and concrete of each class shall have a minimum strength in compression as follows:

1. Class 1 Neat (Containing gypsum and water only) -----1800 lbs. per sq. in.
2. Class 2 Containing not more than 3% by weight of wood chips or fiber ---1000 lbs. per sq. in.
3. Class 3 Containing not more than 12 $\frac{1}{2}$ % by weight of wood chips or fiber 500 lbs. per sq. in.



(b) *Bolting up.* As erection progresses, the work shall be securely bolted up or welded to take care of all dead load, wind and erection stresses.

(c) *Erection stresses.* Wherever piles of material, erection equipment or other loads are carried during erection, proper provision shall be made to take care of stresses resulting from the same.

(d) *Alignment.* No riveting or welding shall be done until the structure has been properly aligned.

(e) *Riveting.* Rivets driven in the field shall be heated and driven with the same care as those driven in the shop.

(f) *Turned bolts.* Holes for turned bolts to be inserted in the field shall be reamed in the field.

(g) *Field painting.* All field rivets and bolts, also all serious abrasions to the shop coat, shall be spot painted with the material used for the shop coat, or an equivalent, and all mud and other firmly attached and objectionable foreign materials shall be removed, before general field painting.

1. Responsibility for this touch-up and cleaning, as well as for general field painting, shall be allocated in accordance with accepted local practices and this allocation shall be set forth explicitly in the contract.

(14) **LIGHT GAUGE STEEL STRUCTURAL MEMBERS.** (a) *Scope.* The requirements of this section shall apply to the design of structural members formed of sheet or strip steel less than 3/16 inch thick and used for load carrying purposes in buildings and structures within the scope of this code. All such structural members shall be capable of supporting all required loads without exceeding the allowable unit stresses specified in this section and shall be designed in accordance with recognized engineering practice.

(b) *Material.* 1. Steel shall conform to the specifications of the American Society for Testing Materials for Light Gauge Structural Quality Flat Rolled Carbon Steel Serial Designation A-245 and A-246. The terms C, B and A used herein to designate grades of steel refer to the grades provided by those A.S.T.M. specifications.

2. Steel of higher strength than is covered by the above mentioned A.S.T.M. specifications may be used at the unit stresses, herein specified for "other grades" of steel provided the design is based upon the minimum properties of those grades of steel as guaranteed by the manufacturer. When requested by the industrial commission, the manufacturer shall furnish certified data showing the properties of such grades of steel.

(c) *Basic design stresses. Allowable working stress.* 1. Tension on the net section of tension members, and tension and compression,  $f_t$ , on the extreme fibers of flexural members shall not exceed the values specified in the following table except as otherwise provided in this section.

Grade of Steel	Minimum Yield Point Pounds Per Sq. In.	Allowable Working Stress Pounds Per Sq. In.
C.....	33,000	18,000
B.....	30,000	16,500
A.....	25,000	13,500

Other Grades Allowable Stress Minimum Yield Point Divided by 1.85

2. Compression on unstiffened elements. Compression  $f_c$ , in pounds per square inch on flat unstiffened elements, shall not exceed the values in accordance with the following formula:

- a. For  $w/t$  not greater than 12,  $f_c = f_b$
- b. For  $w/t$  greater than 12 but not over 30  
 $f_c = [1.67 f_b - 5330] - (1/18) (f_b - 8150) w/t$
- c. For  $w/t$  over 30 but not over 60  
 $f_c = 12,600 - 148.5 (w/t)$

In the above formula  $w/t$  = Ratio of flat width to thickness of an element.

3. Allowable web shear.

a. The maximum average web shear stress,  $v$ , in pounds per square inch on the gross area of a flat web shall not exceed the values in accordance with the following formula:

$$v = \frac{64,000,000}{(h/t)^2} \text{ with a maximum of } 2/3 f_b.$$

In the above formula

- $t$  = web thickness  
 $h$  = clear distance between flanges  
 $f_b$  = allowable working stress as specified in (c).

b. Where the web consists of 2 or more sheets, each sheet shall be considered as a separate member carrying its share of the stress. If, in such cases, the sheets are joined together by continuous welds or by rows of spot welds parallel to the flanges, "h" shall be the vertical distance between the rows of welds or between a row of welds and the flange, whichever is the greater, (rather than the distance between flanges) provided the longitudinal spacing of welds along each row of welds does not exceed  $h/3$ .

(d) *Maximum slenderness ratio.* 1. The maximum allowable ratio  $\frac{L}{r}$  of unsupported length,  $L$ , to radius of gyration,  $r$ , of compression members shall be as follows:

- a. Columns, and other primary compression members ..... 120
- b. Load-bearing studs ..... 160
- c. Secondary members ..... 200

(15) **PLASTIC DESIGN AND FABRICATION.** The design, fabrication and erection of structural steel for buildings and structures by the plastic design method shall conform with recognized good engineering practice as approved by the industrial commission.

*Note:* It will be the policy of the industrial commission to accept methods of plastic design which conform with the Rules for Plastic Design and Fabrication of Structural Steel issued by the American Institute of Steel Construction.

*History:* 1-2-56; cr. (9)(d)(7.) Register, October, 1957, No. 22, eff. 11-1-57; cr. (15), Register, September, 1959, No. 45, eff. 10-1-59.

**Ind 53.25 Steel joist construction (1) DEFINITION.** Steel joist construction shall consist of decks or top slabs defined in section Ind 53.25 (7), supported by separate steel members referred to as steel joists. Any steel member suitable for supporting floors and roofs between the main supporting girders, trusses, beams, or walls when used as hereinafter stipulated shall be known as a "steel joist". Such steel joists may be made of hot or cold formed sections, strip or sheet steel, riveted or welded together, or by expanding.

(2) **LIMIT OF SPAN AND SPACING.** The clear span of steel joist shall not exceed 24 times the depth of the steel portion of the steel joist.

(a) The spacing of steel joist shall not exceed 24 inches on centers for floors. In no case shall the joist spacing exceed the safe span of the top slab, deck, or flooring over the said joist. The spacing of steel joist for roofs shall not exceed the safe span of the top slab or roof deck.

(b) Where these spans or spacings are exceeded, the requirements for steel joist construction shall not apply, but the steel members shall be designed in accordance with the requirements of section Ind 53.24.

(3) **MATERIALS.** All steel joist used in the construction of buildings and structures shall be fabricated from materials of uniform quality and free from defects that would impair the strength or stability of the structure.

(a) All steel joist shall receive one coat of asphalt base paint or an equivalent protective covering before leaving the fabricating shop.

*Note:* It will be the policy of the industrial commission to approve, subject to the provisions of this section, steel joist that conform to the following Standard Specifications of the American Society for Testing Materials.

1. Steel for bridges and buildings, A.S.T.M. Designation A-7.
2. Flat rolled carbon steel sheets of structural quality, Grade C, A.S.T.M. Designation A 245.
3. Hot rolled carbon steel strip of structural quality, Grade C, A.S.T.M. Designation A 303.

(4) **DESIGN OF STEEL JOIST.** An open web steel joist built up of bars or other sections, or one fabricated by expanding a rolled section shall be designed as a truss. The compressive stress in chord members and diagonals of the joist shall not exceed those given in section Ind 53.24 for main members. The tensile stress shall not exceed 20,000 pounds per square inch in any member. The minimum shear to be used in designing the web members at any point in an open web steel joist shall not be less than 50 per cent of the required maximum and reaction for such steel joist.

(a) A solid web steel joist shall be designed as a beam in accordance with the requirements of section Ind 53.24.

(b) In the completed structure, the top chords of open web steel joist or the top flanges of solid web steel joist may be considered as being stayed laterally when the deck or top slab over the steel joist complies with the provisions of section Ind 53.25 (7).

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(c) All joints and connections of an open web steel joist shall be capable of withstanding a load at least 3 times the designed load and shall be sufficiently rugged to resist the stresses incident to transportation and erection when handled in a reasonable manner.

(d) All elements of an open web joist shall have their lines of center of gravity meet at a point if practicable; if not, stresses arising from eccentricity shall be included with other stresses in designing these elements.

(e) Ends of steel joist shall be designed to resist the bending produced by the eccentricity of the reaction at the support.

(5) **ERECTION.** The ends of steel joist shall extend a distance of at least 4 inches on to masonry or reinforced concrete supports and at least 2½ inches on steel supports. In floor construction every third steel joist and in roof construction every steel joist supported on concrete or masonry supports shall be anchored thereto with an anchor equivalent to a ¾ inch round bar. All steel joist supported on steel beams shall be secured thereto by welding or with an anchor made of not less than 3/16 inch bar fastened over the flanges of the supporting beams.

(a) The ends of long span steel joist shall extend a distance of not less than 6 inches on masonry or reinforced concrete supports and at least 4 inches on steel supports.

(b) During the construction period, care shall be exercised to prevent excessive concentrated or moving loads. The construction contractor shall provide for adequate distribution of such loads so that the carrying capacity of any steel joist is not exceeded during that period. When erected and bridged, the total concentrated load on any one steel joist shall not exceed 800 pounds and in the case of open web steel joist, such concentrated load shall not be imposed between panel points.

(6) **BRIDGING.** As soon as steel joist are erected, bridging shall be installed between the joist before the application of construction loads. This bridging shall be adequate to support the top chords or flanges against lateral movement during the construction period and shall hold the steel joist in a vertical plane passing through the bearings.

(a) Horizontal bridging shall consist of two continuous horizontal steel members, one of which is attached to the top chord and the other attached to the bottom chord. Attachment to the joist shall be made by welding or by mechanical means, and the attachments shall be capable of resisting a horizontal force of not less than 500 pounds.

The ratio of unbraced length to the least radius of gyration  $\left(\frac{L}{r}\right)$  of the bridging member shall not exceed 300. Where a round bar is used for bridging the diameter shall be at least ½ inch.

(b) Diagonal cross bridging may be used for joist spacing up to 30 inches. The ratio of unbraced length to the least radius of gyration  $\left(\frac{L}{r}\right)$  shall not exceed 200. Connections to the top and bottom chords of the joist shall be made by positive mechanical means or by welding.

(c) In roof construction, where the slope is perpendicular to the

longitudinal axis of the joist, sag rods may be used in lieu of bridging. The rods shall not be less than 1/2 inch in diameter and the number of lines shall be the same as specified for bridging.

(d) In no case shall the spacing of bridging be greater than specified in the following table.

Clear Span	Number of Lines of Bridging
Up to 14 feet -----	One row near center.
14 to 21 feet -----	Two rows placed at 1/3 point of span.
21 to 32 feet -----	Three rows placed at 1/4 point of span.
32 to 40 feet -----	Four rows placed at 1/3 point of span.
40 to 48 feet -----	Five rows placed at 1/3 point of span.

(e) Bridging for long span joist shall consist of cross bracing with an  $\frac{L}{r}$  ratio of not more than 200. The maximum spacing of lines of bridging for long span joist shall not exceed the following:

Joist Depth in Inches	Maximum Spacing of Lines of Bridging
18 to 24 inches, inclusive -----	10 feet
Over 24 to 36 inches, inclusive -----	12 feet
Over 36 inches -----	16 feet

(7) DECKS AND TOP SLABS. Decks or top slabs over steel joist may be of concrete or gypsum poured on metal lath centering attached to the top chords or flanges of steel joist as required elsewhere in this section or on removable centering provided the top chords or flanges of the steel joist are properly stayed by the concrete or gypsum slab. Other equally suitable permanent centering may be used, provided it is substantially attached to the top chords or flanges as required elsewhere in this section and provided these attachments (or the centering itself) are securely anchored into the concrete or gypsum slab. Precast concrete or precast gypsum slabs when securely attached to the top chords or flanges and anchored thereto and brought to a firm bearing, wood decks as stipulated below, and corrugated or other steel roof decks securely anchored to the top chords or flanges may be used over steel joist. Any attachment or pair of attachments when applied shall be capable of staying the top chord or flange laterally in both directions and in the case of open web steel joist, shall be spaced not farther apart than the panel point spacing. Decks or top slabs over steel joist shall not be assumed to carry any part of the compression stress in the steel joist.

(a) Flat wood decks of single thickness of one inch nominal material shall not have a span of more than 20 inches for floors, or 30 inches for roofs. All such decks shall be securely fastened to the joist.

(b) Poured structural slabs of concrete, gypsum or other similar material shall not be less than 2 inches thick. They shall be poured upon 3/8 inch ribbed metal lath weighing not less than 4 pounds per square yard for spans not exceeding 24 inches and upon 1/4 inch rib lath weighing not less than 4.5 pounds per square yard for spans not exceeding 30 inches. Other material equally suitable as a form or centering for casting concrete or gypsum slabs may be used in





(a) All members shall be so framed, anchored, tied and braced together as to develop the maximum strength and rigidity necessary for the purpose for which they are used. No member shall be stressed in excess of the strength of its details and connections.

(b) All wood structural members shall be of sufficient quality, size and strength, as to carry their imposed loads safely and without exceeding the allowable working stresses as specified in this section.

(c) The requirements stated are a minimum standard and apply primarily to conventional types of construction.

(d) The substitution of materials other than those called for in the code will be permitted when shown by an approved authority to be equal to or better than those specified.

(e) Workmanship in fabrication, preparation, installation, joining of wood members and the connectors and mechanical devices for the fastening thereof, shall conform throughout to good engineering practice.

(f) Where wood is used in parts of a building or structure habitually exposed to moisture, ample ventilation or sufficient preservative treatment, or both, shall be provided.

(2) Allowable working stresses. In the design of wood structural members and the construction of structures of wood, the following unit stresses in pounds per square inch shall not be exceeded.

(a) Stresses that exceed those given in the following table for the lowest grade of any species shall be used only when the higher grade of that species is identified by the grade mark or a certificate of inspection issued by a recognized lumber grading or inspection agency.



(a) Girders shall be anchored to the walls and fastened to each other where they intersect or abut to resist safely an outward force equal to the wind pressure.

(b) Floor joists framing into the side of wood girders shall be supported on metal joist hangers or on a bearing strip or ledger board on the side of the girders. Size of ledger shall be at least 2 by 8 inches. The notch in the end of the joist shall be not more than  $\frac{1}{4}$  of the joist depth.

(c) The ends of joists, whether resting upon girders or bearing partitions or abutted against the girders, shall be securely tied to the girders or to each other so as to resist safely an outward thrust or the walls equal to the required wind pressure, or spreading action or the roof, whichever is the greater.

(d) The top or bottom edges of joists may be notched in the outer  $\frac{1}{4}$  of the length not to exceed  $\frac{1}{6}$  of the joist depth. Notching the top or bottom edge of joists will not be permitted in the middle half of the length of any joist.

(e) Header joists over 6 feet long, and tail joists over 12 feet long, shall be hung in approved stirrup irons or joist hangers.

(f) Joists under bearing partitions and running parallel thereto shall be multiple, well spiked, or separated by solid bridging not more than 16 inches on centers to permit the passage of pipes.

(g) Wood cross bridging shall be placed between joists if the span is over 8 feet. The distance between lines of bridging or between bridging and bearing shall not exceed 8 feet. Wood cross bridging properly fitted and securely nailed to joists shall be not less than 3 square inches in cross sectional area.

(h) Metal cross bridging of equal or greater strength may be used in place of the wood cross bridging.

(i) Solid bridging extending the full height of the joist shall be placed between floor joists which cross bearing partitions. Solid bridging shall be placed between joists at the edge of flooring where the attic space is only partially covered.

(6) Fire stopping. Fire stops shall be provided at all intersections of interior and exterior walls with floors, ceilings and roof in such manner as to effectively cut off communication by fire through hollow concealed spaces and prevent both vertical and horizontal drafts.

(a) Furred walls shall have fire stopping placed immediately above and below the junction of any floor construction with the walls, or shall be fire stopped the full depth of the joist.

(b) All spaces between chimneys and wood framing shall be solidly filled with incombustible material at floor levels.

(c) All fire stopping as required in this section shall be not less than 2 inches in thickness and not less in width than the enclosed space within the partition except as provided for chimneys.

(7) Floors supported on masonry walls. Every girder and beam which enters, or rests on, a masonry wall shall have a bearing of at least 4 inches thereon.

(a) Wood members entering masonry party or fire walls shall be separated from the opposite side of the wall and from beams entering the opposite side of the wall by 4 inches of masonry. The ends of the joists, beams and girders shall be splayed or firecut to a bevel of not less than 3 inches in their depth.

(b) Where girders and beams enter masonry they shall be provided with wall plates, boxes or anchors of an approved self-releasing type so arranged as to leave an air space of not less than  $\frac{1}{2}$  inch at sides and ends of member. The ends of girders shall not be sealed in; provided, that where ends of timbers are pressure treated with creosote or other approved preservative, they may be sealed in.

(c) Anchors for each tier of joists more than 5 feet above grade shall be provided where they enter masonry walls, and also where they are parallel to masonry walls. Such anchors shall be  $\frac{3}{4}$  inch by  $1\frac{1}{4}$  inch iron, or equal, not less than 20 inches long, fitted with a  $\frac{3}{8}$  inch by 6 inch pin at the wall end, and shall be spaced not more than 6 feet apart. The pin shall be placed horizontally in the wall and 4 inches from the opposite face of such wall. Such anchors shall in all cases occur on the opposite ends of the same run of joists, and where the length of joists is less than the distance across a building, the end of joists shall be lapped and spiked so as to form a continuous tie across the building. Anchors shall be placed across the top of joists that run parallel to the wall, and shall be fastened to the ends of joists below the neutral axis.

(8) Wood trusses and built-up members. Wood trusses and similar framing shall have all joints accurately cut and fitted together so that each bearing is true and drawn tightly to full bearing.

(a) All wood trusses shall be securely fastened to the supports and each truss shall be secured in position laterally by bracing the top and bottom chords at points not more than 25 feet apart.

(b) All girders and beams built up of strips, boards or dimension lumber shall be fastened together by glueing, nailing, spiking or bolting in a manner to develop the full strength of the parts. The stiffness of all members, and the strength of all joints, splices and laps, shall be fully developed.

(9) POST AND COLUMNS. Wood posts, when used in basements, shall bear on a cement base which shall extend at least 3 inches above the finish floor. The base shall bear directly on the post footing.

(a) Short columns are those having an  $\frac{l}{d}$  ratio of 10 or less in which  $l$  = unsupported length in inches and  $d$  the least side in inches.

(b) Safe load for short columns may be obtained by the formula

$$\frac{P}{A} = S$$

in which  $\frac{P}{A}$  represents the working stress for the column and  $S$  represents the safe unit compressive stress parallel to the grain given in the table of working stresses.

(c) Safe load for long columns of square or rectangular shape may be obtained by the formula:

$$\frac{P}{A} = \frac{0.30E}{\left(\frac{l}{d}\right)^2}$$

Where  $E$  is the modulus of elasticity as given in the table on working stresses. The value  $\frac{P}{A}$  calculated by this formula shall in no case exceed  $S$ .

(10) Structural glued laminated lumber.

(a) The term "structural glued laminated lumber" as used herein refers only to those glued laminated structural members in which the grain of all laminations of a member is approximately parallel.

(b) The following allowable unit stresses shall be used in design of structural glued laminated members.

**ALLOWABLE UNIT STRESSES FOR STRUCTURAL GLUED LAMINATED LUMBER**

Species and Combinations of Lumber Grades			Allowable Unit Stresses in Pounds Per Square Inch							
Outer Laminations		Inner Laminations	Extreme Fibre in Bending "f"		Tension Parallel to Grain "t"		Compression Parallel to Grain "c"		Horizontal Shear "H"	Compression perpendicular to Grain "c"
Grade	Number Each Side	Grade	Laminations		Laminations		Laminations			
			4 to 14	15 or more	4 to 14	15 or more	4 to 14	15 or more		
<b>DOUGLAS FIR, COAST REGION</b>										
Select Structural	1/5 of total	Construction	2,600	2,600	2,400	2,600	2,000	2,000	165	415
Dense Construction	All	Dense Construction	2,400	2,600	2,600	2,600	2,200	2,300	165	455
Dense Construction	1/14 of total	Construction	2,400	2,600	2,200	2,400	1,900	2,000	165	455
Select Structural	One	Construction	2,200	2,600	2,400	2,600	1,900	2,000	165	415
Select Structural	1/5 of total	Standard	2,200	2,200	2,000	2,400	1,800	1,900	165	415
Select Structural	One	Standard	2,000	2,200	2,200	2,400	1,900	2,000	165	390
Construction	All	Construction	2,000	2,200	2,000	2,400	1,800	1,900	165	390
Standard	All	Standard	1,600	2,000	2,000	2,400	1,800	1,900	165	390
<b>PINE, SOUTHERN</b>										
No. 1	All	No. 1	2,600	2,600	2,600	2,600	2,100	2,100	200	385
B & B Dense	1/14 of total	No. 2	2,400	2,600	2,600	2,600	2,000	2,000	200	450
B & B	One	No. 2	2,400	2,400	2,600	2,600	2,000	2,000	200	385
No. 1	1/5 of total	No. 2	2,400	2,600	2,400	2,600	2,000	2,000	200	385
No. 2 Dense	All	No. 2 Dense	2,000	2,600	2,600	2,600	2,200	2,300	200	450
No. 2 Dense	1/14 of total	No. 2	2,000	2,600	2,200	2,600	1,900	2,000	200	450
No. 2	All	No. 2	1,800	2,200	2,200	2,600	1,900	2,000	200	385

The Modulus of Elasticity (E) is 1,800,000 pounds per square inch for dry conditions of use. Allowable stresses are for normal conditions of load and dry conditions of use.

History: 1-2-56; am. (9); (9) (a); (9) (b); (9) (c), Register, June, 1956, No. 6, eff. 7-1-56; r. (2) and recr. (2); and cr. (10), Register, August, 1957, No. 20, eff. 9-1-57; r. and recr. (9), Register, September, 1959, No. 43, eff. 10-1-59.

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Chapter Ind 54

FACTORIES, OFFICE AND MERCANTILE BUILDINGS

Ind 54.001	Scope	Ind 54.10	Trap doors and floor openings
Ind 54.01	Construction, height and allowable area	Ind 54.11	Lighting
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Ind 54.03	Type of exits	Ind 54.13	Isolation of hazards
Ind 54.04	Total width	Ind 54.14	Standpipes and fire extinguishers
Ind 54.05	Capacity of buildings	Ind 54.15	Automatic sprinklers
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Ind 54.08	Enclosure of stairways and shafts	Ind 54.18	Signs indicating number of persons
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Ind 54.001 Scope. This classification includes all factories and workshops (including all places where manual labor is employed), office buildings, telegraph and telephone offices, mercantile establishments where commodities are bought or sold, taverns, warehouses, railroad stations, exhibition buildings, and places where not more than 100 persons assemble for recreation, entertainment, worship, or dining purposes.

Ind 54.01 Construction, height and allowable area. (1) Buildings in this classification shall be of the type of construction, and shall not exceed the number of stories as specified in this section. The floor area of any such building shall not exceed that permitted for the corresponding type of construction and number of stories.

Types of Construction	Number of Stories	Maximum Floor Areas (Sq. Ft.) When Building Fronts on		
		1 Street	2 Streets	3 or more Streets
Fire-Resistive .....		No Restrictions		
Mill Construction .....	6 or 7 stories	6,000	9,000	12,000
	4 and 5 stories	10,000	15,000	18,000
	2 and 3 stories	15,000	18,000	20,000
	1 story	20,000	25,000	30,000
Ordinary Construction .....	4 stories	6,000	9,000	12,000
	2 and 3 stories	7,500	11,000	15,000
	1 story	12,000	15,000	20,000
Frame Construction .....	2 stories	5,000	6,000	7,000
	1 story	10,000	12,000	14,000

(2) When the entire building is protected by an automatic sprinkler system, the above areas may be increased 66%. There shall be no area restriction in one story mill constructed buildings protected by an approved automatic sprinkler system. In one story buildings of ordinary construction, whose contents are incombustible, and whose

floors, roofs, and structural framing are of incombustible material there shall be no area restriction.

(3) No building shall be limited in area when divided into sections which do not exceed the maximum areas tabulated in this order by division walls. Such division walls shall have not less than a 4-hour fire-resistive rating as specified in section Ind 51.05 and shall extend 3 feet above the roof unless the roof is of fire-resistive construction. All openings in such walls shall be protected by fire-resistive doors as specified in section Ind 51.09. Such doors may normally remain open if held in that position by fusible links.

**History:** 1-2-56; am. (2) and (3), Register, September, 1959, No. 45, eff. 10-1-59.

**Ind 54.02 Number and location of exits.** (1) Every building and every story thereof shall have at least 2 exits, with the following exceptions:

(a) First and second story storage rooms not over 3000 square feet in area.

(b) The second story of a 2 story building, provided such story is used only for offices; is not over 3000 square feet in area; and has a stairway enclosed with not less than one-hour fire-resistive construction, as specified in section Ind 51.05, leading directly to the outside and not leading to the basement. Such enclosure shall be unpierced except for the entrance and exit doors.

(c) Only one exit will be required for a retail establishment or office occupancy having a floor area of not more than 600 square feet provided the entrance door opens directly to the outside, and no part of the room is more than 50 feet from the exit.

(2) Additional exits shall be provided so that no part of any factory or mercantile building having contents which are liable to burn with extreme rapidity or from which poisonous fumes may be liberated or explosions occur in case of fire, will be more than 75 feet distant from an exit. In other buildings in this classification this distance may be increased to 100 feet and where approved sprinklers are provided throughout the building, a further increase to 150 feet will be permitted. All of the above distances are to be measured along public passageways and aisles.

(3) Exits in all buildings of this classification shall be so located and distributed so as to afford the best possible egress.

**History:** 1-2-56; cr. (1) (c), Register, September, 1959, No. 45, eff. 10-1-59.

**Ind 54.03 Type of exits.** (1) At least one-half of the exits above required shall be stairways as specified in sections Ind 51.16-Ind 51.18. The other exits shall be either stairways or horizontal exits as specified in section Ind 51.19, or fire escapes as specified in section Ind 51.20. No fire escape, however, will be accepted as a required exit on any building more than 5 stories or 55 feet in height. In a 2 story building, an outside wooden stairway may be used as an exit.

(2) Every building which will accommodate more than 50 persons above the second story shall have at least 2 stairways.

(3) Wherever stairways are required under this classification, ramps with a slope not greater than one foot in 6 feet may be substituted. Ramps shall comply with all the requirements for stairways as to construction, enclosures, width, landing and lighting, and shall

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be surfaced with an approved non-slip material. Handrails shall not be required where the slope of the ramp is less than one foot in 10 feet.

**Ind 54.04 Total width.** (1) In a building not provided with horizontal exits, the total width of stairways shall be not less than the following:

- (a) In ordinary or frame buildings, 60 inches per 100 persons; if sprinklered, 40 inches per 100 persons.
- (b) In fire-resistive and mill buildings:

	Fire-resistive Sprinklered	Fire-resistive not Sprinklered	Mill Sprinklered	Mill not Sprinklered	
	30	50	40	60	in. per 100 persons on 2nd floor
plus	15	25	20	30	in. per 100 persons on 3rd floor
plus	12	20	16	24	in. per 100 persons on 4th floor
plus	9	15	12	18	in. per 100 persons on 5th floor
plus	6	10	8	12	in. per 100 persons on 6th floor
plus	3	5	4	6	in. per 100 persons on 7th floor
plus	0	0	0	0	in. per 100 persons on 8th and above
but in no case shall such total width be less than					
	30	50	40	60	in. per 100 persons on any one floor.

(2) Standard fire escapes (section Ind 51.20) may be substituted for stairways to the extent of not more than 1/4 of the required total width, subject to the provision of section Ind 54.02.

(3) If horizontal exits (section Ind 51.19), are provided for any floor, the number of persons accommodated on such floor may be increased at the rate of 100 persons for each 40 inches of width of such exits, provided such increase shall not exceed 100% of the number of persons accommodated by the stairways.

*Example:* As examples of calculations under this section where the same number of persons are to be accommodated on each floor, the following table shows the number accommodated by 2 stairways of minimum width (each 44 inches wide):

- (a) Frame and ordinary buildings, 147 persons total, above first story; if sprinklered, 220 persons.
- (b) Fire-resistive and mill buildings:

Height of building	Fire-resistive Sprinklered	Fire-resistive not Sprinklered	Mill Sprinklered	Mill not Sprinklered	
2 stories.....	298	175	220	147	Persons on each floor
3 stories.....	195	117	147	98	Persons on each floor
4 stories.....	154	92	116	77	Persons on each floor
5 stories.....	133	80	100	67	Persons on each floor
6 stories.....	122	73	92	61	Persons on each floor
More than 6 stories..	117	70	---	---	Persons on each floor

(4) Where one minimum stairway and one "A" fire escape are provided, take 3/4 of the above numbers; subject to the limitations of section Ind 54.02.

**Ind 54.05 Capacity of buildings.** (1) In calculating the aggregate width of exits, the capacity of the buildings shall be established as follows:

(a) Stores, first floor and basement .....	30 sq. ft. per person
(b) Stores, second floor and above .....	60 " " " "
(c) Dining Rooms, Cafes, Taverns, etc. ....	10 " " " "
(d) Places of Seated Assemblage .....	7 " " " "
(e) Warehouses .....	300 " " " "
(f) Factories and Offices .....	75 " " " "

(2) The above figures are based on the net area of each occupied space. Where dining rooms, cafes, dance halls and places of seated assemblage accommodate more than 100 persons, see section Ind 55.01.

(3) In other occupancies not specified above, the capacity shall be determined by the actual number of persons liable to be accommodated therein and no greater number of persons will be permitted therein.

**Ind 54.06 Exit doors.** (1) Every door which serves as an exit from a room accommodating more than 10 persons, or which is an exit from a public passageway or stairway shall be a standard exit door as specified in section Ind 51.15, except that such exit door need not swing outward if it accommodates less than 25 persons, is not located at the foot of a stairway, or is not more than 4 risers above the outside grade.

(2) Every exit doorway from each floor, other than the principal entrance on the first floor, shall be indicated by an approved illuminated sign over the door bearing the word EXIT or OUT in plain letters not less than 5 inches in height.

**Ind 54.07 Passageways.** Where there is not direct access to outside exit doors, safe and continuous passageways, aisles or corridors leading directly to every exit shall be maintained at all times on all floors of all buildings. Every passageway, aisle or corridor shall conform in width to the rule for width of stairways as specified in section Ind 54.04. Widths shall be measured in the clear, at their narrowest points produced by any projection, radiator, pipe or other object and the required width shall be maintained clear and unobstructed at all times.

**Ind 54.08 Enclosure of stairways and shafts.** (1) All stairways, ramps and elevator shafts in buildings 3 or more stories in height, including landings shall be enclosed as follows:

(a) Fire-resistive buildings, not less than 2-hour fire-resistive construction as specified in section Ind 51.05.

(b) Mill constructed buildings, not less than 2-hour fire-resistive construction as specified in section Ind 51.05.

(c) Ordinary constructed buildings, not less than one-hour fire-resistive construction as specified in section Ind 51.05.

(d) Frame constructed buildings, not less than one-hour fire-resistive construction as specified in section Ind 51.05.

(2) All doors opening into such enclosures shall be as specified in section Ind 51.09, and all windows shall be of wired glass and metal frames and sash.

(3) *Exception:* Monumental stairs leading from the street floor to the second floor or to a basement used for commercial purposes need not be enclosed, provided they are effectively cut off at the second floor (and basement) by partitions having fire-resistance as specified above.

*Note: Elevators and Elevator Enclosures:* For requirements governing the installation and operation of elevators, and the construction and protection of elevator shaftways, see the elevator code issued by the industrial commission, which code applies to all public buildings and places of employment.

**Ind 54.09 Opening to roof.** Every building, or section of a building, 2 stories or more in height shall have a permanent means of access to the roof from the inside. Where such access consists of a scuttle in the roof, the opening shall be not less than 20 by 30 inches and there shall be a permanent ladder or stairway leading thereto.

**Ind 54.10 Trap doors and floor openings.** Every opening through any floor or through any roof used by the public or by employes shall be guarded by a substantial enclosure or rail not less than 3 feet 6 inches high. Floor openings in buildings of more than 2 stories, unless enclosed with fire-resistive enclosures as specified in section Ind 54.08 shall be protected by fire-resistive doors as specified in section Ind 51.09.

**Ind 54.11 Lighting.** (1) All stairways, fire escapes and exits and the passageways leading thereto when used at night shall be properly illuminated to facilitate egress. The intensity of illumination shall be not less than 2.5 foot candles.

(2) All gas jets or gas lights in factories or workshops where combustible material is used, shall be properly enclosed by globes or wire cages, or otherwise properly guarded.

**Ind 54.12 Sanitary equipment.** (1) Toilet facilities shall be provided and maintained in connection with every public building and place of employment under this classification.

(2) In all public buildings under this classification, separate toilet rooms shall be provided for males and females, except as in section Ind 52.51 and as otherwise provided hereunder.

(3) In public places where stimulating drinks, such as beer, wines and other alcoholic beverages, are served for consumption on the premises, except in dining rooms, restaurants and similar places where the serving of drinks is only incidental to the regular food service, and where no public bar is provided, toilet fixtures shall be provided in connection with the area served, for the sex (or sexes) served, as follows:

(a) One water-closet for every 40 females, or fraction thereof;

(b) One water-closet for every 75 males, or fraction thereof, and

(4) Where there are more than 25 males accommodated there shall be one urinal for every 50 males, or fraction thereof, in excess of 25.

(5) The numbers indicated above refer to the number of persons that can be accommodated at the same time and shall be determined on the basis specified in section Ind 54.05.

(6) In toilet rooms used by males, all water-closets shall have an elongated bowl and open front seat without cover. All urinals shall be of the type of construction specified in section Ind 52.60. Where a urinal is not provided, the water-closet shall have an elongated bowl with self-rising seat. In toilet rooms used by females, all water closets shall have an elongated bowl and open front seats without cover.

(7) In public occupancies other than those where stimulating drinks (as defined above) are served for consumption on the premises, one water-closet of the type described above shall be provided in connection therewith for each sex accommodated. Except that a small mercantile establishment where normally not more than 25 patrons are expected to be on the premises at the same time, need have in connection therewith only one toilet room to accommodate both the public and employees.

(a) *Toilets in places of employment.* See section Ind 22.03 of the general orders on sanitation following this section.

(b) *General requirements.* For general toilet room requirements in regard to location, construction, ventilation, fixtures, etc., see sections Ind 52.50 to Ind 52.64, inclusive.

(8) Where toilet rooms used by males and females adjoin, the walls between such toilet rooms, if of studding with lath and plaster, the lath shall be of metal.

(9) **DRINKING WATER.** Sufficient pure drinking water piped from mains, or in sanitary containers, shall be provided in connection with every public building under this classification. Drinking fountains separate from other fixtures and constructed as provided in the state plumbing code, or individual drinking cups of a type approved by the state board of health, shall be provided, except in places where food or drink is served and in public buildings where normally not more than 25 patrons are expected to be on the premises at the same time. Drinking fountains shall not be placed in toilet rooms.

(a) For drinking water requirements in places of employment see section Ind 22.17 of the general orders on sanitation following this section. See also section 146.07, Wis. Stats., which prohibits the use of common drinking cups.

(10) **WASHING FACILITIES.** In every public building and in every place of employment, except as provided in section Ind 22.13, wash bowls shall be provided in connection with toilet rooms, one for every 2 water-closets or urinals, or fraction. Clean individual cloth or paper towels and soap shall be provided in connection with every lavatory installation. The installation of a towel for common use, or the use of any common towel is not permissible.

See also sections Ind 22.13 to Ind 22.15, inclusive.

**History:** 1-2-56; am. (3) (a) and (b) and (6), Register, September, 1959, No. 45, eff. 10-1-59.

**Note:** The following sections, Ind 22.03, Ind 22.13, Ind 22.14, Ind 22.15, Ind 22.17, and Ind 22.18 are taken from the general orders on sanitation issued by the industrial commission. For further requirements on sanitation, see that publication.

**Ind 22.03 Number of closets and urinals. (1)** In every place of employment, whether heretofore or hereafter constructed, one water-

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closet shall be provided for every 20 persons, or fraction thereof, of either sex.

(2) In addition thereto, where more than 10 males are employed, one urinal shall be provided for every 40 males, or fraction thereof. Where not more than 10 males are employed, either a urinal shall be provided or the water-closet shall have an elongated bowl and self-rising seat.

(3) The requirements in subsections (1) and (2) shall be computed on the basis of the maximum number of employes on any one shift.

(4) In all new installations, only individual urinals shall be used. Such individual urinals shall be of porcelain, vitreous china, or stainless steel, set into the floor, the floor graded to the urinal, and shall be equipped with an effective automatic tank or valve or a satisfactory foot operating flushing device.

(5) All water-closets hereafter installed shall be of the individual type having elongated bowls and open front seats.

**Ind 22.13 Lavatories; location.** Washing facilities shall be provided in or adjacent to every toilet room. In new installations, there shall be at least one lavatory for every 5 fixtures (closets and urinals), or fraction.

*Cross reference*—See section Ind 22.14 for additional requirements for places of employment.

See section Ind 22.14 on material from which lavatories shall be made and for allowable types of installations.

*Note:* One lavatory for every 2 or 3 fixtures is recommended.

**Ind 22.14 Washing facilities for places of industrial employment.**

(1) **LAVATORIES.** (a) There shall be at least one lavatory supplied with hot and cold water provided for every 10 employes or fraction in the following places of employment:

1. In all places of employment where lead, arsenic, or other poisonous or injurious materials are handled by the employes.

2. In all places of employment where food is prepared or manufactured.

3. In all other places of employment where the employes' hands become dirty or greasy.

(b) Wash rooms shall be constructed according to the requirements for toilet rooms.

(c) Twenty inches of trough wash sink, or of the edge of a circular wash fountain shall be considered the equivalent of one lavatory. The trough wash sink or circular wash fountain shall not be equipped with a plug or other stopper. Each lavatory and each 20 inches of trough wash sink shall be equipped with either a faucet or spray pipe, so connected as to supply water of the desired temperature.

(d) All lavatories shall be made of porcelain, enameled iron, or other similar impervious material.

(2) **SHOWERS.** Shower facilities shall be provided in accordance with the following requirements:

(a) In places of employment where poisonous or irritating materials which penetrate the clothing are handled at least one shower shall be provided for every 10 employes or fraction who handle or come in contact with such materials.

(b) In glue factories, tanneries, foundries, mines, and other places of employment where materials which penetrate the clothing are handled at least one shower for every 20 such employes, or fraction, shall be provided.

(c) Showers shall be provided with hot and cold water and be equipped with a hot and cold regulating valve. The regulating device or valve shall be plainly marked and shall be so located that the valve can be operated without standing under the shower. Supply or feed pipes to showers shall be placed overhead or protected to avoid the possibility of a person coming in contact with the hot water pipes.

(d) Each shower room or compartment shall be constructed of material impervious to moisture, and the floor under each shower head shall be of such construction, or be provided with a suitable sanitary device, so as to prevent slipping.

(3) SOAP. For all hand washing facilities in places of employment, an adequate quantity of bland, non-irritating, non-abrasive soap which shall effectively cleanse the skin shall be provided.

**Ind 22.15 Towels.** In all places of employment, the use of towels in common is prohibited. Where hand washing facilities are required, individual cloth towels, magazine type roll cloth towels, or paper towels shall be furnished by the employer. Electric hand dryers may be used if approved by the industrial commission.

**Ind 22.17 Drinking water.** (1) Every place of employment shall be supplied with sufficient pure drinking water and the faucets or outlets for the same shall be placed convenient to the employes, but not in toilet rooms. Common drinking cups are prohibited. Sanitary drinking fountains shall be installed or individual cups shall be provided by the employers.

*Cross reference*—See the state plumbing code for required construction of sanitary drinking fountains.

(2) Where running water is not available, a covered drinking water container equipped with a faucet or bubbler shall be provided. The container shall be cleaned and sterilized at frequent intervals and kept in a sanitary condition and in good repair.

**Ind 22.18 Rest rooms.** (1) Rest rooms shall be provided in all places where 5 or more women are employed. Each rest room shall be furnished for the purpose of reclining. In buildings where individual offices are leased or rented, at least one rest room shall be provided to serve the occupants of the building.

(2) Every rest room shall be lighted, heated and ventilated to conform to the requirements of the heating, ventilation and air conditioning code issued by the industrial commission.

**Ind 54.13 Isolation of hazards.** (1) All heating boilers and furnaces, power boilers, fuel rooms, storage vaults for paints, oils, and similar

combustibles and other similar hazards in a building shall be isolated from the rest of the building by at least a 2-hour fire-resistive enclosure as specified in sections Ind 51.05 and Ind 51.06; except that in buildings not more than 2 stories in height and having a floor area of not more than 3000 square feet per floor, a one-hour fire-resistive enclosure as specified in sections Ind 51.05 and Ind 51.06, or better, shall be provided.

(2) All openings shall be protected with self-closing fire-resistive doors as specified in section Ind 51.09.

(3) Space heaters, suspended furnaces, and direct-fired unit heaters, fired with various fuels, may be used without an enclosure where approved by the industrial commission. Where suspended furnaces and direct fired unit heaters are used without an enclosure, all such units shall be located at least 7 feet above the floor.

**Ind 54.14 Standpipes and fire extinguishers.** (1) For exterior standpipes see section Ind 51.21.

(2) Standard interior first aid standpipes, as specified in section Ind 51.21 shall be provided in all buildings of more than 2 stories and more than 3000 square feet undivided floor area, where flammable material or any other hazardous condition is present, unless an approved automatic sprinkler system is provided.

(3) Wherever water supply of sufficient pressure is not available, 2 standard fire extinguishers as specified in section Ind 51.22 shall be provided on each floor in place of each required interior standpipe.

**Ind 54.15 Automatic sprinklers.** (1) A complete automatic sprinkler system, as specified in section Ind 51.23, shall be provided in every building of this classification, except office buildings not used for mercantile purposes, where more than 50 persons are employed or accommodated above the third story except as provided below.

(2) In every such building where more than 50 persons are employed or accommodated above the second story, an automatic sprinkler system shall be provided in the basement and sub-basements, except where there is no city water supply.

(3) An office building in which one or more of the lower floors is used for mercantile purposes, shall be classed as a mercantile building, except that no sprinklers will be required in such portions of the building as are used for offices only.

(4) No sprinklers will be required in a building of fire-resistive construction whose contents are not readily combustible.

**Ind 54.16 Fire alarm.** A fire alarm system complying with section Ind 51.24 shall be provided in every factory or workshop where more than 10 persons are employed above the second story except buildings which are provided with a complete automatic sprinkler system and except fire-resistive buildings whose contents are practically incombustible.

**Ind 54.17 Floor load signs.** (1) In every factory, workshop, warehouse, or other building where material is piled, notices of a perma-

nent character shall be painted or otherwise prominently displayed, stating the live load in pounds per square foot which the floor is designed to carry. Such notices shall be placed in full view, on each floor.

(2) Where floors are always used for the storage of some particular material, the walls shall be marked to the height to which the material shall be piled without exceeding the safe load.

**Ind 54.18 Signs indicating number of persons.** In all buildings of this classification where 50 or more persons are accommodated on any floor above the second, notices shall be prominently displayed stating the maximum number of persons on each floor for whom stairways and other exits have been provided according to sections Ind 54.02-Ind 54.06. Such notices shall be placed in full view, on each floor.

**Ind 54.19 No smoking signs.** Smoking shall not be permitted in retail establishments where flammable materials are handled or sold. Suitable signs bearing the words "No Smoking" shall be erected in all places where such hazard exists.

**Ind 54.20 Tents.** All tents used for sales or storage purposes shall conform to the requirements specified for tents in sections Ind 55.58-Ind 55.63, inclusive, of this code.

**History:** Cr. Register, September, 1959, No. 45, eff. 10-1-59.



## Chapter Ind 55

## THEATERS AND ASSEMBLY HALLS

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Ind 55.29	Boiler and furnace rooms	Ind 55.67	Toilet facilities
Ind 55.30	Lights and lighting	Ind 55.68	Outdoor theaters
Ind 55.32	Sanitary equipment		
Ind 55.33	Standpipes		

**Ind 55.001 Theaters.** In the theater classification, are included all buildings or parts of buildings, containing an assembly hall, having a stage which may be equipped with curtains or permanent or movable scenery, or which is otherwise adaptable to the showing of plays, operas, motion pictures or similar forms of entertainment.

**Ind 55.01 Assembly halls.** (1) In the assembly hall classification, are included all buildings, or parts of buildings, other than theaters, which will accommodate more than 100 persons for entertainment, recreation, instruction, worship or dining purposes.

(a) Every assembly hall which will accommodate not more than 100 persons shall conform to the requirements of Chapter 54, covering factories, office and mercantile buildings.

**Ind 55.02 Class of construction. Capacities.** (1) The capacities of buildings or parts of buildings in this classification for the various types of construction shall not exceed, and shall comply, with the following requirements:

## INDUSTRIAL COMMISSION

## MAXIMUM CAPACITIES

Type of Construction	With Stage	Without Stage
	No limit	No limit
Fire Resistive -----	750	1,500
Mill -----	500	1,000
Ordinary -----	300	750
Frame -----		

(a) *Exception:* The fire protection for structural steel supporting the roof may be omitted in one-story buildings in this classification provided the roof and its supports are of incombustible or mill construction throughout.

(2) Frame construction. Where a building of this classification is erected of frame construction, the following restrictions shall apply:

(a) Not more than one story in height without a balcony, and with no basement except a heating and fuel room enclosed with 4-hour fire-resistive construction as specified in sections Ind 51.05 and Ind 51.06 with all interior openings protected as specified in section Ind 51.09.

(b) Located at least 20 feet from any other building or adjoining property line.

(c) Is not built in connection with a building used for any other purpose.

(d) Is provided with foundation walls and piers of masonry construction.

(e) Where motion picture booths are required, they shall be enclosed with 4-hour fire-resistive construction.

*Exception:* In places of worship, a full basement and a balcony seating not more than 30 persons may be provided.

(3) Balconies accommodating more than 100. In any theater or assembly hall, balconies which accommodate more than 100 persons shall be of fire-resistive construction as specified in section Ind 51.001.

*History:* 1-2-56; (1); (1) (a); (2); (2) (a); (2) (b); (2) (c); (2) (d); (2) (e); (2) (f); (3); am. Register, June, 1956; No. 6, eff. 7-1-56; am. (1) (a), Register, August, 1957, No. 20, eff. 9-1-57.

Ind 55.03 Height above grade. (1) THEATERS. The height of the sills of the principal entrance doors to any theater, as defined in section Ind 55.001, shall be not more than 18 inches above the outside grade at that point. The floor level at the highest row of seats on the main floor shall not be more than 6 feet above the outside grade at the main entrance; the floor level at the lowest row of seats on the main floor shall be not more than 6 feet below, or above, the grade at the nearest exit.

(2) ASSEMBLY HALLS AND ROOF GARDENS ABOVE FIRST STORY. Where assembly halls are provided above the first story, the following limitation of occupancy, type of construction and exit facilities shall apply:

Type of Construction	Maximum No. of Occupants	Height Above Grade
Fire-resistive -----	No limit	No limit*
Mill, or Ordinary -----	400	2nd story or 22 feet
Mill, or Ordinary -----	200	3rd story or 35 feet

\*One smokeproof stair tower from the level of the assembly hall leading directly to the exterior at street grade shall be provided for every 750 persons capacity, or fraction thereof. These stairways shall be at least 44 inches wide and shall be in addition to other required stairways in the building.

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(3) **BASEMENT ASSEMBLY HALL.** An assembly hall may be placed in the basement of a fire-resistive building if the capacity does not exceed 2,500 persons or in the basement of a building of mill or ordinary construction if the capacity does not exceed 400 persons.

*History:* 1-2-56; r. and recr. Register, September, 1959, No. 45, eff. 10-1-59.

**Ind 55.04 Exposure and courts.** (1) Every theater or assembly hall which accommodates more than 600 persons shall have at least 3 walls abutting on streets, alleys, or open courts.

(2) The wall containing the main entrance to any theater or assembly hall shall abut on a street. The lobby or passageway leading from the main entrance doors to the foyer or auditorium shall be direct and unobstructed and of a minimum width equal to the sum of the widths of the main entrance doors. There shall be no openings from other occupancies to such a corridor or passageway.

(3) The width of every exit court shall be at least 6 feet for an occupancy not exceeding 500 persons, and shall be increased at the rate of one foot per each 500 persons additional. Every such court shall lead to a public thoroughfare, either directly, or through a passageway of equal width, not less than 8 feet high enclosed with unpierced 4-hour fire-resistive walls, ceiling and floor as specified in sections Ind 51.05 and Ind 51.06. The floor and ceiling shall be designed for a live load of not less than 150 pounds per square foot. No such court, or passageway shall be used for storage or any other purpose whatsoever.

**Ind 55.05 Separation from other occupancies.** (1) Every theater and assembly hall shall be separated from any other occupancy by an absolute occupancy separation as specified in section Ind 51.08, except that a special occupancy separation as specified in section Ind 51.08 may be used between an assembly hall accommodating not more than 750 persons and any other non-hazardous occupancy. Where a special occupancy separation is permitted in this order, a single fire-resistive door may be used for the protection of openings.

(2) For assembly halls of unlimited capacity located on upper floors of fire-resistive buildings which are served by elevators, the elevator openings may be permitted under the requirements for special occupancy separation specified in section Ind 51.08, but otherwise, absolute occupancy separation is required.

(3) No garage, chemical laboratory or other occupancy where flammable or explosive liquids or gases are used or stored shall be located in the same building with a theater or assembly hall.

**Ind 55.06 Capacity.** (1) The following table includes various types of occupancy within the scope of this section, together with the method to be used in determining the capacity.

(2) No greater number of persons than the number thus established shall be permitted in any theater or assembly hall.

Use or Occupancy	Basis of Capacity
(a) Arenas and Field Houses -----	4 sq. ft. per person. Use seated areas only.
(b) Assembly Halls, with stage -----	7 sq. ft. per person.
(c) Banquet Halls -----	10 sq. ft. per person.
(d) Churches (Auditoriums) -----	7 sq. ft. per person.

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(e) Churches (Dining Rooms) -----	10 sq. ft. per person.
(f) Dance Halls -----	10 sq. ft. per person.
(g) Dining Rooms -----	10 sq. ft. per person.
(h) Gymnasiums -----	6 sq. ft. per person for seated space. 15 sq. ft. per person for unseated space.
(i) Lecture Halls -----	7 sq. ft. per person.
(j) Lodge Halls -----	6 sq. ft. per person for seated space. 15 sq. ft. per person for unseated space.
(k) School Auditoriums -----	7 sq. ft. per person.
(l) Skating Rinks -----	15 sq. ft. per person.
(m) Theaters -----	7 sq. ft. per person.
(n) Theater Lobbies -----	7 sq. ft. per person.

(3) The capacity of theaters and theater lobbies must be combined to determine the theater capacity.

**Ind 55.07 Number and location of exits.** (1) Every floor and balcony of a theater and assembly hall shall be provided with not less than 2 exits, placed as far apart as practicable and so located that if any exit is blocked, some other exit will still be available from every part.

*Exception:* In places of worship, only one exit will be required from a balcony seating not more than 30 persons.

(2) Where more than 600 persons are accommodated, there shall be at least 3 exits and where more than 1,000 persons are accommodated, there shall be at least 4 exits.

(3) Exits shall be distributed on all sides which adjoin streets, alleys or open courts.

**Ind 55.08 Type of exits.** (1) The required exits from any part of a theater or assembly hall shall be exit doorways, stairways or ramps.

(2) All exits to grade from a higher or lower level shall be stairways or approved ramps. In all theaters and in assembly halls having a capacity of more than 400 persons, where the exit rise is not more than 3 feet approved ramps shall be used. By approved ramp is meant an incline located inside the building and having a slope of not more than one foot of rise in 8 feet.

(3) Stairway exits shall be interior stairways, or smokeproof towers as specified in section Ind 51.17; except that "B" type fire escapes may be used as exits from balconies for not more than one-half the required exit width, if located against blank walls.

**Ind 55.09 Stairways.** (1) Every stairway in a theater or assembly hall, except stairways from the main floor to the first balcony, shall be enclosed as specified in sections Ind 51.17 and Ind 51.18. No closet or open space shall be placed under any stairway, platform or landing.

(2) Stairways and steps which have more than 3 risers shall have handrails on both sides.

(3) Every stairway used by the public in a theater or assembly hall, shall have a uniform rise of not more than 7½ inches and a uniform tread of not less than 10 inches, measuring from tread to tread and

from riser to riser. No winders shall be used and there shall be not less than 3 nor more than 16 risers in any run.

*Note:* See section Ind 51.16 for general stairway requirements.

**Ind 55.10 Exit doorways and doors.** (1) Every required single exit doorway shall contain a standard exit door as specified in section Ind 51.15. For double doors, with or without mullions, the width of each door may be reduced to 2 feet 6 inches.

(2) No single door or leaf of a double door, shall be more than 3 feet 6 inches wide, and no 2 doors shall be hinged together.

(3) No rolling, sliding or revolving door shall be counted as an exit from any theater or assembly hall, nor shall any such door be permitted where it would be liable to be used by the public as an exit.

(4) Sills at all exit doorways shall be level and flush with adjacent inside floors and ramps. Where an aisle or passageway leads to an exit from either side of the exit doorway there shall be a level floor space at the doorway subtending the width of the aisle and the doorway.

**Ind 55.11 Exit lights.** (1) In every theater and assembly hall, except church auditoriums, exit lights shall be provided immediately over all exit doorways, and in such other places as may be necessary to direct the occupants to exit doorways and to a street, alley or exit court. The installation of such exit lights shall comply in all respects with the provisions of the Wisconsin state electrical code.

(2) Every light over an exit doorway shall be a red illuminated sign bearing the word EXIT or OUT in plain letters not less than 5 inches in height.

(3) All exit lights shall remain lighted during each occupancy and until the occupants have left the building.

**Ind 55.12 Width of exits.** (1) The total width of exits from every theater and assembly hall, and from every part thereof, shall not be less than the following: Buildings of fire-resistive construction, 36 inches per 100 persons. Buildings of ordinary construction, 40 inches per 100 persons. Buildings of frame construction, 44 inches per 100 persons.

(2) In theaters, the width of the front entrance shall be not less than  $\frac{1}{3}$  of the total required exit width.

**Ind 55.13 Seating.** (1) All seats, chairs and benches shall be placed not less than 32 inches back to back measured horizontally, except that for grandstands and bleachers without back rests this dimension may be reduced to 24 inches. For benches without arms, grandstand and bleacher seats, the seating capacity shall be established by allowing one sitting or seat to each 18 inches of length. (See section Ind 55.54).

(2) All seats, chairs and benches, except chairs in boxes or loggias, shall be securely fastened to the floor; or if the floor is level, the seats or chairs may be fastened together in groups of 4 or more. Loose chairs or seats shall not be used unless a special permit is secured from the industrial commission.

(3) There shall not be more than 12 seats in a row between aisles, nor more than 6 seats in a row which has an aisle on one side only, except that for grandstands and bleachers without back rests and with

a railing along the front, these figures may be doubled. No aisles will be required for such grandstands or bleachers where the seats extend to the floor or ground without a railing along the front.

(4) No seat bench or platform on which seats are placed shall be more than 22 inches in height of riser.

(5) No seat bench, or other platform or floor area on which seats are placed, or the top seat of any bleachers shall be nearer the ceiling than 8 feet, nor nearer to the bottom of any truss or girder than 6 feet 4 inches.

(6) The requirements of this order do not apply to restaurants, dining or dance halls.

**Ind 55.14 Width of aisles.** (1) Aisles having seats on both sides shall not be less than 2 feet 10 inches wide at the beginning and shall increase in width toward the exits at the rate of  $\frac{1}{4}$  inch per foot of run; or the aisle may have a uniform width not less than the average width of the foregoing calculation. No wall aisle shall be less than 3 feet wide and no other straight aisle shall be less than 3 feet 6 inches wide.

(2) There shall be a cross aisle leading to each required side exit. Cross aisles shall not be less than 6 feet 8 inches back to back of adjacent rows of seats.

**Ind 55.15 Lobbies and foyers.** The width of lobbies and foyers shall be determined on the same basis as required for exits in section Ind 55.12, but shall in no case be less than 5 feet wide, and shall be so designed and apportioned as to prevent congestion and confusion. Lobbies and foyers which serve as means of egress shall be at least equal in combined width to the required width of the stairways, passageways, aisles or exit doorways leading to them.

**Ind 55.16 Inclines and aisle steps.** (1) To overcome any difference in level between courts, corridors, lobbies, passageways or aisles required, or used, in egress from a theater or an assembly hall, approved ramps as specified in section Ind 55.08 shall be employed where the difference in elevation does not exceed 3 feet, except that this requirement need not apply to balconies.

(2) Steps in balcony aisles shall extend the full width of the aisle and shall have a uniform rise and run as specified in section Ind 55.09. No handrails will be required.

**Ind 55.17 Obstruction.** (1) All lobbies, aisles, passageways and doorways shall be kept free from furniture, drapes, display equipment, merchandise, vending machines and other obstructions, and no person except an employe shall be allowed to stand in, or occupy, any of the aisles, passageways, corridors or lobbies during any performance or public gathering. Except that patrons may be allowed to wait in a lobby or similar space if such use does not encroach upon the required clear width of the exits. Such waiting shall be restricted to areas separated from the required exit ways by fixed railings not less than 42 inches high. In entrance lobbies only, the exit space may be divided by railings not less than 36 inches high set up in the direction of travel in an approved manner for the regulation of ingress and egress.

(2) A booth or counter for the sale of package merchandise may be placed in the lobby or foyer of a theater where there is sufficient

excess space so that the front of the booth or counter can be located not less than 5 feet back of the line marking the width of the lobby or foyer required for exit purposes.

**Ind 55.18 Mirrors and false openings.** (1) No mirror shall be placed in any part of a theater or assembly hall used by the public for exit purposes, including lobbies, corridors, stairways, ramps or any other exit facility. Where a mirror is used in an auditorium, it shall be placed flush with the wall and with the bottom at least 7 feet above any floor, balcony, gallery or platform.

(2) No false opening or decorative device giving the appearance of a door or window, where none exists, shall be placed in any part of a theater or assembly hall used by the public.

**Ind 55.19 Decorations.** Fabric decorations used in theaters and assembly halls shall be flame proof.

**Ind 55.20 Elevator and vent shafts.** Enclosures for elevator and vent shafts shall be of 2-hour fire-resistive construction as specified in section Ind 51.05 and all openings therein protected by fire-resistive doors or windows as specified in sections Ind 51.09 and Ind 51.10.

**Ind 55.21 Stage separation.** (1) In every theater and assembly hall the stage shall be completely separated from the auditorium by a proscenium wall of 4-hour fire-resistive construction as specified in section Ind 51.05, except as follows:

(a) In theaters and assembly halls having a capacity not exceeding 500 persons, the proscenium wall shall be of 2-hour fire-resistive construction as specified in section Ind 51.05, or better.

(b) In theaters and assembly halls an open stage or platform will be permitted without the proscenium wall separation from the auditorium, provided the stage or platform is not more than 6 feet higher or wider than the proscenium opening.

**Ind 55.22 Proscenium wall.** (1) The proscenium wall shall extend from an incombustible foundation, or from the lowest fireproof floor below the stage floor, to the highest adjoining roof, except that where a 4-hour fire-resistive wall is required it shall extend at least 2 feet above the highest adjoining roof.

(2) There shall be not more than 2 openings in the proscenium wall below the level of the auditorium floor, and not more than 2 openings other than the proscenium opening, in the proscenium wall above the level of the auditorium floor, except that in addition to the above openings there may be one opening to provide access through the proscenium wall to the orchestra pit.

(3) Each such opening shall not exceed 21 square feet in area and shall be protected by a fire-resistive door as specified in section Ind 51.09, or equal.

**Ind 55.23 Proscenium curtain.** (1) Where a proscenium wall is required for the separation of a stage from an auditorium, the proscenium opening if more than 60 feet in width shall be provided with a rigid metal curtain conforming to the regulations contained in Appendix P of the Building Code recommended by the National Board of Underwriters, Fifth Edition, Revised Reprint, 1934. For a proscenium opening 60 feet or less in width, a rigid metal curtain or

a curtain of asbestos conforming to the following specifications, or of equivalent approved construction, shall be used.

(2) Asbestos curtains shall be substantially woven of asbestos fiber not less than 95% pure, and shall weigh not less than 2½ pounds per square yard. There shall be incorporated into the yarn before weaving, either monel metal, nickle, brass or other metal or alloy, having not less strength than these metals at temperatures up to 1700 degrees Fahrenheit and no less resistance to corrosion at ordinary temperatures. All seams shall be vertical, shall be lapped not less than one inch and shall be sewed in 2 rows with not less than ¼ inch pure asbestos twine. At the top and bottom of the curtain a 2½ inch (or larger) steel pipe shall be placed and shall be securely fastened in, and covered by, the curtain. The curtain shall overlap the proscenium wall not less than 12 inches at each side and at the top, and shall be guided at each side by metallic loops or rings sliding on a ¾ inch steel cable or No. 6 U.S. standard gauge wire.

(3) In addition to any decoration, the curtain shall be painted on both sides with a mineral paint having a silicate of soda binder, which will completely fill the cloth. Filler paint shall have not less than 4 parts of casein in each 10 parts of silicate of soda. The paint shall be well brushed into the cloth so that no light or smoke can come through.

(4) For curtains of any type, the connections between curtain and wall shall be made as nearly smoke-proof as possible. Smoke grooves or pockets shall be of structural steel shapes and plates not less than ¼ inch thick. These grooves or pockets shall be not less than 14 inches deep and 6 inches wide and shall be set back from the face of the arch at least 6 inches. They shall extend from the stage floor to a point 3 feet above the top of the raised curtain, and shall be securely bolted to the proscenium wall.

(5) Provision shall be made to prevent the curtain from leaving or binding on the guides under any conditions. Appropriate limit chains shall be provided to stop the downward travel of the top of the curtain at a line not less than 12 inches above the top of the proscenium opening. No part of a curtain, nor any of the curtain guides, or equipment, shall be supported by, or fastened to, any combustible material.

(6) The hoisting apparatus for the curtain shall be designed with a factor of safety of 8 or more.

(7) Besides the regular operating mechanism, there shall be an emergency device which will allow the curtain to drop by gravity. The device shall be so arranged that it can be easily operated by hand from each side of the stage and from the fly galleries, and also that its operation will be controlled by 135 degree fusible links, or other approved heat release devices, placed on each side of the stage, and when thus operated the curtain shall descend at its normal rate of speed.

(8) The curtain and its operating mechanism shall be so designed and constructed at all points, whether specifically mentioned or not, as to form an efficient and reliable barrier against fire and smoke, according to the best practice.

(9) Detailed plans and specifications for all curtains and their operating mechanism shall be submitted to the industrial commission for approval before installation.



**Ind 55.24 Automatic smoke outlet.** Where a fireproof proscenium curtain is required, or provided, the stage shall be provided with one or more automatic smoke outlets, constructed of metal or other incombustible material, placed near the center and above the highest part of the stage, and having a combined area equal to not less than 8% of the area of the stage floor. Vertical louver openings shall be placed not less than 3 feet above the roof and shall be not less than twice the area of the shaft. The smoke outlet shall be designed and constructed so as to open by gravity, and so as to effectively overcome the effects of neglect, rust, dirt, frost, snow, heat, twisting, or warping of the frame work. The louvers, or dampers in the openings shall be held closed by cotton or hemp cords running to the stage floor close to each stage door. Fusible links, or other approved heat release devices, shall be inserted in each cord near the outlets.

**Ind 55.25 Stage vestibules.** All entrances to the stage shall be vestibuled in such manner as to protect the curtain, scenery, and auditorium from drafts of air.

**Ind 55.26 Footlight trough.** The footlight trough shall be made of, or lined with, incombustible material.

**Ind 55.27 Fireproof paint.** All stage scenery, properties, curtains, and decorations made of combustible material, and all woodwork in or about the stage, shall be effectively flame-proofed.

**Ind 55.28 Stage accessory rooms.** (1) All dressing rooms, property rooms, and other storage or workrooms shall be built of incombustible material throughout, and shall be separated from the stage by a special occupancy separation as specified in section Ind 51.08.

(2) No dressing room or employes' room shall be placed more than one story below the grade line, and no dressing room shall be placed above or below the auditorium unless separated therefrom by a special occupancy separation as specified in section Ind 51.08.

**Ind 55.29 Boiler and furnace rooms.** (1) Every boiler or furnace room, including the breeching and fuel room, shall be enclosed with a 3-hour fire-resistive enclosure as specified in sections Ind 51.05 and 51.06, except that in case of an assembly hall accommodating not more than 300 persons, a 2-hour fire-resistive enclosure as specified in sections Ind 51.05 and 51.06 may be used. All openings shall be protected with self-closing fire-resistive doors as specified in section Ind 51.09.

(2) All appliances used for heating water which are fired with solid fuel, liquid fuel or gas shall be located in a boiler or furnace room except that gas fired booster water heaters used exclusively for sanitizing dishes and cooking utensils need not be installed in a fire-resistive enclosure.

**History:** 1-2-56; r. and recr. (2), Register, August, 1957, No. 20, eff. 9-1-57; am. (1), Register, September, 1959, No. 45, eff. 10-1-59.

**Ind 55.30 Lights and lighting.** (1) Electric lights shall be used for lighting where electric current is available. No oil lamps or other open lights shall be used in or about any stage containing scenery.

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(2) No gas lighting of any kind shall be used on any stage containing scenery, nor in any property room, storage room, scene dock, or fly gallery, except in localities where electricity is not available.

(3) In all theaters and assembly halls, all stairways, passageways, and exit doors shall be properly lighted and shall remain lighted throughout every performance or entertainment and until the audience has left the building.

**Ind 55.32 Sanitary equipment.** (1) **TOILETS AND URINALS.** Separate toilet rooms in connection with the auditorium shall be provided for males and females. One water-closet shall be installed for each 200 females or fraction, and one water-closet and one urinal for each 300 males or fraction, assuming the audience to be equally divided between males and females; except that in dance halls there shall be provided one water-closet for each 100 females or fraction, one water-closet for each 300 males or fraction and one urinal for each 150 males or fraction.

(2) **NUMBER OF TOILETS WHERE ALCOHOLIC BEVERAGES ARE SERVED ON PREMISES.** Where stimulating drinks, such as beer, wines and other alcoholic beverages, are served for consumption on the premises, there shall be provided one water-closet for every 40 females, or fraction, one water-closet for every 150 males, or fraction, and one urinal for every 50 males, or fraction; except that where the capacity in such places exceeds 300 persons, the ratio of the number of fixtures to the number of persons accommodated in excess of 300 need be only one-half of the above.

(3) **TOILETS IN CONNECTION WITH STAGE.** There shall be separate water-closets provided for males and females in connection with the stage of every theater and assembly hall which is equipped for the showing of stage productions.

(4) **TOILETS IN CONNECTION WITH MOTION PICTURE BOOTH.** In theaters where motion picture machines are run continuously for a period of more than 2 hours without at least 10 minutes intermission for the motion picture machine operator for each 2 hour period, toilets shall be provided in direct connection with the motion picture booth.

*Note:* For general toilet room requirements see sections Ind 52.50 to Ind 52.64, inclusive.

(5) **DRINKING WATER.** Separate drinking fountains of a type approved by the state board of health shall be provided for the stage and auditorium where water supply is available. Drinking fountains shall not be placed in toilet rooms.

(6) **WASHING FACILITIES.** Washbowls shall be provided in connection with toilet rooms, one for every 2 closets and urinals or fraction.

**Ind 55.33 Standpipes.** Where proper water supply is available, at least one first aid standpipe, as specified in section Ind 51.21, shall be provided on the stage of every theater and assembly hall where a fire curtain is required. Each hose shall be not more than 75 feet long, and where such hose will not reach every part of the stage section additional hose connections and hose, or additional standpipes, shall be provided.

**Ind 55.34 Fire extinguishers.** (1) Standard fire extinguishers of an appropriate type as specified in section Ind 51.22 shall be provided for all theaters and assembly halls as follows:

- (a) Two on stage, if scenery is used.
  - (b) One on stage, if no scenery is used.
  - (c) One in motion picture booth, or in ticket office if there is no booth.
  - (d) One in dressing room section.
- (2) Extinguishers shall be properly exposed to view and always accessible.

**Ind 55.35 Automatic sprinklers.** In every theater and assembly hall where a proscenium curtain is required, approved automatic sprinklers, as specified in section Ind 51.23, shall be provided under the stage, under the stage roof, and in the dressing rooms, but not in the automatic smoke outlet.

**Ind 55.40 Motion picture machine booths, general.** Every motion picture machine using nitro-cellulose film, together with all auxiliary and associated equipment, shall be enclosed in a booth so arranged as to permit the operator to walk freely on either side and in back of the machine. At least 48 square feet in area shall be provided for one machine, and 24 square feet additional for each machine over one. The ceiling height shall be not less than 7 feet.

**Ind 55.41 Construction of booth.** The floor of each motion picture booth shall be constructed of masonry or reinforced concrete, or shall be covered with not less than 2 inches of fire-resistive material. The walls and ceiling shall be not less than 2-hour fire-resistive construction as specified in section Ind 51.05.

**Ind 55.42 Doors.** (1) The door to the booth shall be not larger than necessary for the safe and proper use and maintenance of the booth and equipment, but in no case shall its dimensions be smaller than 2 feet by 5 feet or larger than 3 feet by 7 feet. The top of the door shall be not less than 12 inches below the ceiling of the booth.

(2) The door shall be a tight-fitting self-closing fire door as specified in section Ind 51.09, shall open outwardly, and shall not be equipped with any latch.

**Ind 55.43 Openings.** (1) Two openings for each motion picture machine may be provided. The one for the operator's view shall not be larger than 200 square inches and the one for projection not larger than 120 square inches. Where separate stereopticon, spot, or flood-light machines are installed, not more than one opening shall be provided for each such machine for both the operator's view and the projection of light. All such openings shall be as small as practicable.

(2) Each opening shall be provided with an approved gravity shutter set into guides not less than one inch at sides and bottom, and overlapping the top of the opening by at least one inch when closed. Shutters shall be not less than No. 10 U.S. Standard gauge iron or equivalent, arranged to move freely in guides of like material and thickness bolted to the wall. Each shutter shall be suspended by a cord, and shall be so arranged that closing is by gravity action. A

fusible link shall be provided in the cord over each shutter. A link shall also be provided over each magazine, which on operating will close all shutters. A manual release shall be provided near each exit door by which all shutters can be closed simultaneously. Shutters shall not be blocked open nor held open in any manner except by the harness of cords and links as herein described.

**Ind 55.44 Ventilation of booths.** Every booth or room housing projection, sound or any other equipment which vitiates good air conditions or requires the attention of an attendant shall be ventilated as required by section Ind 58.43 of the heating, ventilation and air conditioning code issued by the industrial commission. Fresh air intakes in booth walls, except for outside air, shall not exceed 72 square inches in area, nor be more than 3 inches above the floor. They shall be equipped with automatic shutters as described for projection openings.

**Ind 55.45 Relief outlets.** Every booth or room housing projection, sound or other equipment which constitutes a fire, smoke, explosion or fuming hazard shall be equipped with one or more gravity outlets extending upward from the ceiling through the roof. The net area of such gravity relief outlets shall be equal to one per cent of the room or booth floor area, but not less than 12 inches in diameter. Such outlets shall be constructed as sheet metal ducts having double walls with  $\frac{1}{2}$  inch air space between, or better construction. Where a relief outlet passes through, or is within 18 inches of any combustible construction, or passes through any other occupancy, approved masonry flues as specified for chimneys, section Ind 52.10, shall be used. The relief outlets shall be equipped, at the booth or room outlets, with a gravity shutter which will open automatically under excessive heat conditions. The automatic shutter shall normally be tightly closed where mechanical exhaust ventilation is required in the same room.

**Ind 55.46 Electric wiring.** All lights and electric wiring, also motors, arc lamps, rheostats, and associated electrical equipment shall conform in type and arrangement to the requirements of the Wisconsin state electrical code.

**Ind 55.47 Motion picture machine.** Every projection machine shall be securely fastened to the floor, and together with sound head and other associated equipment, shall be of safe design. No part of the film shall be outside of a tight metal enclosure during projection, and the feed and take-up reels shall have riveted, flanged, or welded joints. A shutter shall be placed in front of the condenser, arranged so as to be closed except when held open by the operator, or by some mechanical device which will assure immediate closure when operation of the machine is stopped.

**Ind 55.48 Fire protection in booth; care and use of film.** (1) All shelves, furniture and fixtures shall be incombustible. No combustible material shall be permitted to be within such booth, except films and film cement not exceeding one pint. Smoking is prohibited. Heating equipment in booths shall be limited to steam, warm air, hot water or electric convection heaters with low surface temperature elements.

Radiators shall be protected by  $\frac{1}{4}$  inch mesh screen with the top sloped at least 45 degrees to the horizontal.

(2) Films not in process of rewinding, examination or projection shall be kept in metal containers. Up to 40 pounds of film may be kept in the projection booth in interstate commerce commission shipping containers. Excess over 40 pounds shall be kept in an approved film cabinet, but the total quantity of film in any booth shall not exceed 125 pounds.

(3) Rewinding in the projection booth is prohibited unless done in an approved enclosed type rewind machine. An approved can with self-closing hinged cover shall be provided for scrap film.

(4) Up to 125 pounds of film in addition to that permitted in a projection booth, may be kept in containers as specified above, providing this excess is in a rewind room of not less than 80 square feet area, and of the construction specified in sections Ind 55.41 and Ind 55.42. Such room shall have a vent of at least 50 square inches area extending upward to the outside of the building, with a clearance to combustible material conforming to section Ind 55.45. Furniture and heating shall be as for the projection booth, and smoking is prohibited.

*Note:* In the foregoing section the weight of a 1000 foot roll of 35 millimeter film is assumed as 5 pounds.

**Ind 55.49 Portable booths.** (1) Every portable booth used to confine the fire hazards of a motion picture machine shall be of approved design conforming to the requirements for permanent booths.

(2) Every booth used for more than 3 consecutive performances in one location will be considered a permanent booth.

**Ind 55.50 Maintenance.** All theaters and assembly halls, and all parts thereof, shall be kept clean, sanitary and in good repair.

#### GRANDSTANDS, BLEACHERS, TENTS AND PLACES OF OUTDOOR ASSEMBLY.

**Ind 55.51 Grandstands.** (1) Grandstands erected of frame construction shall be located at least 20 feet from any other building or adjoining property line unless the exterior walls of such adjacent building are of 2-hour fire-resistive construction or better and all openings therein are protected with fire-resistive doors and windows as specified in sections Ind 51.09 and Ind 51.10.

(2) No wood grandstand unit shall exceed 10,000 square feet in ground area or 200 feet in length.

(3) Wood grandstand units shall be placed not less than 20 feet apart or shall be separated by walls of not less than 2-hour fire-resistive construction.

(4) The highest level of seat platforms of any wood grandstands shall not be more than 20 feet. Portable grandstands or bleachers within tents shall not be more than 12 feet above the ground or surface at the front of the grandstand.

(5) All grandstands shall be designed and constructed to conform with the structural requirements of Chapter 53 of this code.

(6) Seat boards and foot boards shall be designed to safely support a live load of not less than 120 pounds per lineal foot. The width of foot boards shall not be less than  $7\frac{1}{2}$  inches.

(7) The space under a grandstand shall be kept free from extraneous flammable materials and shall not be occupied for other than exit purposes except that such space, if enclosed with one-hour fire-resistive construction or better, may be used for non-hazardous purposes if approved in writing by the industrial commission.

**Ind 55.52 Exits.** (1) Every grandstand, balcony or tier considered separately shall be provided with at least 2 exits located as remotely from each other as practicable and leading directly to the outside at grade. If the capacity of any such structure, balcony, or tier exceeds 1,000 persons, there shall be at least 3 exits and where the capacity exceeds 4,000 persons, there shall be at least 4 exits.

(2) Exits shall be distributed uniformly to prevent congestion and shall be so located that the line of travel to an exit or to the entrance to an exit passageway is not greater than 150 feet.

(3) The total width of exits from any grandstand, balcony or tier shall not be less than 22 inches per 100 persons, except that for grandstands which are constructed of incombustible material throughout and have a closed incombustible deck under the seats, the total width of exits may be not less than 22 inches for each 500 persons or fraction.

**Ind 55.53 Aisles and passageways.** (1) All ramps, stairs, doorways and doors used for exit purposes shall conform to the requirements of sections Ind 55.08, Ind 55.09 and Ind 55.10 of this code.

(2) Aisles having seats on both sides shall not be less than 3 feet 6 inches in width and aisles having seats on one side only shall not be less than 24 inches wide. Cross aisles shall not be less than 48 inches in width. No aisles will be required for grandstands or bleachers where the seats extend to the floor or to the ground without a railing along the front.

(3) Trailer seating mounted on incombustible decking not exceeding 300 capacity each shall be provided with aisles or stairways not less than 36 inches in width.

**Ind 55.54 Seating.** (1) The seating arrangement shall comply with the requirements of section Ind 55.13 except that for seats without backs the horizontal distance from back to back of seats shall not be less than 22 inches. There shall be a space of not less than 12 inches between the back of each seat and the front of the seat immediately behind it. All measurement is to be taken between plumb lines.

(2) Where the same level is not used for both seat bench and foot rest, independent foot rests shall be provided.

(3) All seat boards and foot boards shall be securely fastened in place in such a manner that they cannot be accidentally displaced.

(4) Where the rise of a seat bench or platform exceeds 11 inches, intermediate steps shall be provided the full width of the aisles. Such steps shall have a rise of not more than 11 inches and a tread of not less than 10 inches *nominal width*. In no case shall the angle of seating exceed 45 degrees.

**Ind 55.55 Guard rails.** A substantial guard rail not less than 42 inches in height and having 2 intermediate rails shall be provided along the back and ends of all grandstands where the seats are more

than 4 feet above the ground. Where the front foot rest of any grandstand is more than 2 feet above the ground, a guard rail extending not less than 36 inches above such front foot rest shall be provided.

**Ind 55.56 Portable grandstands or bleachers.** (1) Portable grandstands or bleachers shall be self-contained units having all necessary parts to withstand and restrain all forces which may be developed during occupancy. They shall be so designed and constructed that if any structural member essential to the strength and stability of the structure is omitted during erection, the presence of unused connections or fittings will make the omission self-evident.

(2) A portable grandstand shall not be used for public occupancy until it has been securely assembled in accordance with this requirement.

(3) Portable grandstands shall be provided with base plates, sills, floor runners, or sleepers of sufficient area and strength to support safely the total live and dead loads.

(4) Where portable grandstands rest directly on the ground, mud sills of suitable material and having sufficient area to prevent dangerous settlement shall be provided under the base plates or sleepers. All mud sills shall be properly anchored to the ground and all bearing surfaces shall be in contact.

(5) A-frames or other supports and seat stringers for portable grandstands or bleachers shall be secured to prevent accidental displacement during occupancy.

(6) Field connections to wood members shall be by means of rivets, bolts, connectors, lag screws, friction or other approved devices. Lag screws shall not be used for direct tension. The use of nails and wood screws is permissible for holding wood posts together except that they shall not be used for demountable connections.

(7) Wood members in tension shall be connected at each end by not less than 2 bolts or lag screws or by approved connectors or other approved devices. Adequate provision shall be made to prevent the splitting or shearing of wood at such connections.

**Ind 55.57 Inspection.** Every portable grandstand or bleacher shall be carefully inspected by a building official before each period of public occupancy and any loose connections, defective or broken members or loose supports shall be properly repaired before the structure is used. In cities or towns which do not have a building official, such inspections shall be made by the chief of the fire department or other public official designated by the industrial commission.

**Ind 55.58 Tents.** (1) For the purpose of this section, a tent is a portable, temporary shelter or a structure, the covering of which is made of pliable material.

(2) No tent shall be erected to cover more than 75% of the premises on which it is located.

(3) Tents used for assembly purposes which cover 1500 square feet or more of ground area shall be located at least 20 feet from any other structure or adjoining property lines.

(4) Stake lines of adjacent tents used for assembly purposes shall be sufficient distance from each other to provide an emergency exit

passageway not less than 6 feet in width between stake lines. Proper protection shall be provided along such stake lines to eliminate tripping hazards.

(5) Concession and other tents not used for assembly purposes need not be separated from each other and may be located less than 20 feet from other structures.

(6) This section does not apply to tents or shelters used exclusively for construction purposes.

**Ind 55.59 Structural requirements.** (1) Poles and other members supporting tents shall be of sufficient size and strength to support the structure safely without exceeding the stresses specified in Chapter 53 of this code.

(2) All tents shall be adequately guyed, supported and braced to withstand a wind pressure or suction of not less than 10 pounds per square foot.

(3) The poles, guys, stakes, fastenings, etc., shall be of sufficient strength and so attached as to resist a wind pressure of at least 20 pounds per square foot of projected area of the tent.

**Ind 55.60 Flame resistance.** All tents used for assembly purposes or in which animals are stabled and all other tents used by the public in places of outdoor assembly shall be effectively flame-proofed. The owner shall furnish a certificate or a test report by a recognized testing engineer or laboratory as evidence that such tents have the required flame resistance.

**Ind 55.61 Fire hazards.** (1) The ground enclosed by any tent used in connection with a place of outdoor assembly and for a distance of not less than 10 feet outside such structure on all sides shall be cleared of all flammable material or vegetation which will transmit fire. The premises shall be kept free from such flammable material during the period the premises are used by the public.

(2) No hay, straw, shavings or similar combustible materials other than that necessary for the current feeding and care of animals shall be permitted within any tents used for public assembly except that sawdust and shavings be used if kept damp.

(3) No smoking or unapproved open flame of any kind shall be permitted in any tent while occupied by the public. "No Smoking" signs shall be conspicuously posted in all tents open to the public.

(4) Tents shall not be used for motion picture performances unless safety film is used.

**Ind 55.62 Exits.** (1) Every tent occupied by the public shall have at least 2 standard exits located at or near opposite ends of the structure.

(2) In tents used for assembly purposes, exits shall be provided on 3 sides if the capacity exceeds 600 persons and on 4 sides where the capacity exceeds 1,000 persons. Exits shall be uniformly distributed but in no case shall the line of travel to an exit be greater than 150 feet.

(3) The total width of exits from a tent used for assembly purposes shall not be less than 44 inches per 100 persons. Exit openings shall comply in all respects with the requirements of sections Ind 55.10 and Ind 51.15 of this code.



**Ind 55.63 Electrical installations.** (1) Electrical systems in all places of outdoor assembly shall be installed in accordance with the requirements of the Wisconsin state electrical code. All such systems shall be maintained and operated in a safe and workmanlike manner.

(2) The electrical system and equipment shall be isolated from the public by proper elevation and guarding. All electrical fuses and switches shall be installed in approved enclosures. Cables laid on the ground or in areas traversed by the public shall be placed in trenches or protected by approved covers.

**Ind 55.64 Fire extinguishing equipment.** One or more fire extinguishers of approved type and size shall be provided in connection with every wood grandstand and in all tents used for assembly purposes. Such extinguishers shall be maintained in proper working order and shall be located where they are easily accessible, preferably in or near the ticket office. In large installations, additional fire extinguishing equipment shall be provided as directed by the building official.

**Ind 55.65 Illumination; exit lights and signs.** (1) All exits, aisles and passageways leading to exits in grandstands and other places of outdoor assembly shall be kept adequately lighted at all times when the structure is occupied by the public. Artificial illumination having an intensity of not less than 2.5 foot candles at the floor line shall be provided when natural light is inadequate.

(2) Exit lights and signs complying with the requirements of section Ind 55.11 shall be provided in all places of outdoor assembly where more than 100 persons can be accommodated.

**Ind 55.66 Boiler and furnace room.** Every boiler or furnace room, including the breeching and fuel room, in places of outdoor assembly, shall be enclosed with a 2-hour fire-resistive enclosure or better and all interior openings in walls forming such enclosures shall be protected by self-closing fire-resistive doors. Gas-fired appliances for heating water shall be installed in a boiler or furnace room. Chimneys shall be constructed in conformity with the requirements of section Ind 52.10 of this code.

**Ind 55.67 Toilet facilities.** Separate toilets shall be provided for each sex in connection with all places of outdoor assembly. Toilet rooms and equipment shall comply in all respects with the requirements of sections Ind 52.50-Ind 52.64, inclusive, of this code.

**Ind 55.68 Outdoor theaters.** (1) **DEFINITION AND SCOPE.** For the purpose of this code, an outdoor theater is a place of outdoor assembly used for the showing of plays, operas, motion pictures and similar forms of entertainment in which the audience views the performance from self-propelled vehicles parked within the theater enclosure. The requirements of this section shall apply to outdoor theaters now in existence and to outdoor theaters hereafter constructed, except as provided in subsection (5).

(2) **ENTRANCES AND EXITS.** All entrances and exits for outdoor theaters shall comply with the regulations of the state highway

commission for driveways from property abutting state highways and the following additional requirements:

(a) Not more than one entrance shall be provided for each access road but each such entrance may be divided into 2 roadways and channelized to properly provide for vehicles turning right or left from the highway.

(b) That portion of an entrance or exit lying within the highway right-of-way shall comply with the regulations of the authority in charge of the maintenance of the highway or in the event this authority has no regulation, it shall comply with regulations prescribed by the state highway commission.

(c) Not more than one exit shall be provided for each access highway but such exit may be suitably channelized to provide for right and left turns to the highway, and not more than one traffic lane shall be permitted for each traffic lane on the highway available to vehicles leaving the theater.

(3) **VEHICLE STORAGE.** (a) Sufficient area shall be provided between the highway and the ticket booth to provide storage space for vehicles equal to not less than 10% of the theater capacity. In all cases, sufficient storage space shall be provided so the vehicles will not back up on the traveled way of the highway. Storage area shall be calculated on the basis of 162 square feet per vehicle.

(b) A hold-over storage area having sufficient capacity to accommodate not less than 15% of the theater capacity shall be provided between the ticket booth and the ramp area.

(4) **TOWER CONSTRUCTION.** The tower supporting the motion picture screen shall be designed to resist a horizontal wind pressure of not less than 30 pounds for every square foot of exposed surface.

(5) **LOCATION OF TOWER.** The screen shall be so oriented that the picture is not visible from any major highway. This requirement does not apply to towers erected prior to January 1, 1952.

(6) **CONCESSION AND MOTION PICTURE MACHINE BOOTH.** The motion picture booth and equipment shall comply in all respects with the requirements of sections Ind 55.40-Ind 55.49, inclusive, of this code.

(a) Concession buildings in connection with outdoor theaters shall comply with the requirements of Chapter 54 of this code.

(7) **SANITARY EQUIPMENT.** Separate toilet rooms shall be provided for males and females in connection with all outdoor theaters as required by section Ind 55.32. Toilet rooms and equipment shall comply in all respects with the requirements of sections Ind 52.50-Ind 52.64 of this code.

(a) In determining the number of fixtures required for toilet rooms in connection with outdoor theaters, the capacity of the theater is established by allowing  $2\frac{1}{4}$  persons for each vehicle accommodated, exclusive of vehicles parked in the waiting or hold-over area.

(b) Where the public toilet rooms are so located that the patrons must cross the ramp area in order to reach the toilet rooms, a suitable approach or passageway leading thereto shall be maintained. Such passageways shall be properly lighted and they shall be kept free from obstructions.

(8) **RAMPS AND SPEAKER EQUIPMENT.** (a) Ramps shall be spaced not less than 38 feet apart. The ramps shall be so designed that any vehicle can move from its parked position to the exit driveway without being required to back up.

(b) All ramps, parking areas, entrance and exit driveways shall be properly surfaced with a gravel surfacing or better, adequate to withstand the weight of the vehicles accommodated.

(c) Where additional seating space is provided in the theater enclosure for patrons using public transportation facilities, the speaker arrangement shall be such that the sound will be confined to the immediate seating area and not broadcast beyond the theater enclosure.

(d) There shall not be less than 18 feet distance between speaker posts, measured parallel to the ramps, except in seated areas for patrons using public transportation. All electrical wiring and electrical equipment shall be installed in accordance with the provisions of the Wisconsin state electrical code. Each speaker post shall be wired with wire approved for underground use laid in trenches not less than 12 inches in depth.

(9) **LIGHTING.** All entrance and exit driveways shall be adequately lighted and properly marked to avoid congestion and confusion and shall remain lighted throughout the performance and until the audience has left the area.

(10) **SPEED LIMIT.** In every outdoor theater, notices of a permanent character shall be prominently displayed designating the maximum speed limit permitted for cars driven within the area. Parking lights shall be used when cars are moving in the theater enclosure.

(11) **RUNNING OF ENGINES.** At each performance, an instructive trailer shall be shown on the screen informing the patrons of the danger of carbon monoxide poisoning when the engine is running and stating that when it becomes necessary to run the engine, the windows of the vehicle should be opened at least one inch.

**History:** 1-2-56; r. and rec. Register, September, 1959, No. 45, eff. 10-1-59.



## Chapter Ind 56

## SCHOOLS AND OTHER PLACES OF INSTRUCTION

Ind 56.001	Scope	Ind 56.10	Access to attic and roof
Ind 56.01	Maximum height	Ind 56.11	Floor space and ceiling height
Ind 56.02	Class of construction	Ind 56.12	Basement rooms
Ind 56.03	First floor fire-resistive	Ind 56.13	Assembly rooms
Ind 56.04	Subdivisions and fire stops	Ind 56.14	Seats, desks and aisles
Ind 56.05	Exposure and courts	Ind 56.15	Heating plants
Ind 56.06	Number, location and type of exits	Ind 56.16	Sanitary equipment
Ind 56.07	Total width of exits	Ind 56.17	Artificial lighting
Ind 56.08	Exit doors	Ind 56.18	Fire extinguishers
Ind 56.09	Passageways	Ind 56.19	Fire alarms

**Ind 56.001 Scope.** The requirements of this chapter, sections Ind 56.001 to Ind 56.19, inclusive, shall apply to all public, parochial and private schools, universities, colleges, academies, seminaries, libraries, museums and art galleries; including all buildings or parts of buildings used for the purpose of acquiring knowledge.

**Ind 56.01 Maximum height.** (1) No building which accommodates pupils below senior or junior high school grades shall be more than 3 stories high, nor shall the topmost floor level be more than 35 feet above the grade at any outside exit door.

(2) No building which is used as a senior or junior high school shall be more than 4 stories high, nor shall the topmost floor level be more than 48 feet above the grade at any outside exit door.

**Ind 56.02 Class of construction.** (1) Every building not more than one story in height may be of frame construction as specified in section Ind 51.03.

(2) Every building which is more than one story, but not more than 2 stories in height, shall be of ordinary construction as specified in section Ind 51.02, or better, except as provided in section Ind 56.03.

(3) Every building which is more than 2 stories in height shall be of fire-resistive construction as specified in section Ind 51.001 except that in a 3 story building ordinary construction, as specified in section Ind 51.02, may be used above the third floor level.

**Ind 56.03 First floor fire-resistive.** In all 2 story buildings having more than 4 class, study, or recitation rooms of ordinary size (750 square feet in area) on any floor, the first floor shall be of at least 2-hour fire-resistive construction as specified in section Ind 51.06 unless all of the stairways and corridors throughout the building, including stairs, walls, ceilings and floors are of at least 2-hour fire-resistive construction as specified in sections Ind 51.04 to Ind 51.07 inclusive. In all other 2 story buildings, the basement ceiling shall be of one-hour fire-resistive construction as specified in section Ind 51.06, or better.

**Ind 56.04 Subdivisions and fire stops.** Every building of this classification which is built in connection with a building of a lower grade of construction shall be separated from such other building by walls of 4-hour fire-resistive construction as specified in section Ind 51.05, and all communicating openings shall be protected by fire-resistive doors as specified in section Ind 51.09 or equal. If such openings are used as a means of egress, they shall be kept normally open during the occupancy of the building.

**Ind 56.05 Exposure and courts.** No wall containing windows which light a class, study, recitation or reading room shall be less than 30 feet away from any opposite building, structure or lot line, or opposite court wall; except that the distance from such opposite court wall may be reduced to not less than 20 feet provided light rays at an angle of 30 degrees are not thereby obstructed from entering the entire upper half of any such window.

**Ind 56.06 Number, location and type of exits.** (1) The number and location of exits shall be such that in case any exit is blocked at any point some other exit will still be accessible through public passageways, from every room used by the public or by the occupants generally. Except that in a high school, university, college, library or museum building not more than 2 classrooms of ordinary size (900 square feet area) may be placed between an exit and the end of the building, provided that the exit doors from such classrooms are not more than 10 feet beyond the exit.

(a) Exits shall be distributed so that the entrance to each class, study, or recitation room will not be more than 75 feet distant from an exit measuring along public passageways if the building is of non-fire-resistive construction or 100 feet in a fire-resistive building.

(2) In buildings of more than one story there shall be at least 2 stairway exits, each leading directly out of doors. The remaining exits shall be either such stairways or horizontal exits as specified in section Ind 51.19. Where such stairways lead to the basement they shall be enclosed below the first floor as specified in section Ind 51.18.

(3) In buildings of more than 2 stories all stairways shall be enclosed as specified in sections Ind 51.17 and Ind 51.18.

(4) Fire escapes may only be used as exits from the temporary end of incomplete or unit type buildings, as approved in writing by the industrial commission. Such fire escapes shall be of the "B" type where more than 100 persons can be accommodated above the first story.

(5) Handrails shall be provided on both sides of all exit stairs used by pupils.

(6) Closets shall not be placed below stairways or stairway landings.

**History:** 1-2-56; am. (1), cr. (1) (a), Register, September, 1959, No. 45, eff. 10-1-59.

**Ind 56.07 Total width of exits.** (1) The total width of exits from any floor shall be not less than the following rates, based on the total capacity of such floor and of the floors above.

(a) Fire-resistive buildings, 30 inches per 100 persons.

(b) Ordinary or frame buildings, 40 inches per 100 persons.

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(2) Where permitted under section Ind 56.06, standard fire escapes may be used for not to exceed one-third of the above total widths.

(3) The capacity of a school building shall be established by the actual number of fixed seats in rooms where such are used or by the number of persons which may be accommodated. (See section Ind 56.11). The capacity of a library, museum, or art gallery shall be established on the basis of 100 square feet of total floor area of the building, exclusive of stairways and elevators, to each person, except that for library reading rooms this area shall be reduced to 20 square feet per person for the space so occupied.

**Ind 56.08 Exit doors.** Exit doors shall comply with the requirements of section Ind 51.15, except that in elementary schools the width may be reduced to 3 feet. The aggregate width of exit doors shall be as required in Ind 56.07. No single door or leaf of a double door shall be more than 42 inches wide.

**Ind 56.09 Passageways.** (1) Corridors and passageways shall be so designed as to prevent congestion and confusion and shall be provided with windows and artificial light so as to maintain a light intensity throughout of not less than 2.5 foot candles at the floor line whenever the building is occupied.

(2) The minimum unobstructed width of corridors and passageways which are used by the public or by the occupants generally, shall be determined in the same manner as specified for stairways in section Ind 56.07, but in no case shall this width be less than 4 feet. Corridors and passageways serving as a means of egress shall be at least equal in combined width to the required width of the stairways or passageways leading to them.

**Ind 56.10 Access to attic and roof.** Every building more than one story in height shall have permanent means of access to the roof and attic space from inside the building. Where a scuttle opening is provided, the opening shall be not less than 20 x 30 inches, with a permanent enclosure for a stairway or ladder leading thereto.

**Ind 56.11 Floor space and ceiling height.** (1) All class and recitation rooms shall have a minimum floor space of 23 square feet per person. Rooms used only for study purposes shall have a minimum floor space of 15 square feet per person.

(2) In colleges or universities, classrooms seated with tablet arm chairs or seats without desks shall have a minimum floor space of 10 square feet per person.

(3) All rooms used for educational purposes shall be not less than 9 feet high in the clear except that school buildings which have a sloping ceiling may have a ceiling height of not less than 8 feet on the low side of the classroom provided the average ceiling height is not less than 9 feet in the clear. Toilet rooms, service rooms, store rooms and similar spaces shall not be less than 8 feet in the clear.

**History:** 1-2-56; am. (3), Register, September, 1959, No. 45, eff. 10-1-59.

**Ind 56.12 Basement rooms.** No class, recitation, study, laboratory, domestic science or library room shall have its floor more than 2 feet below the adjoining grade. Industrial arts rooms, shops, toilet rooms and other rooms used by pupils (not including play rooms) shall have

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floors not more than 4 feet below grade. The walls and floor where exposed to soil shall be waterproof and damp-proof.

**Ind 56.13 Assembly rooms.** A room which seats, or which can accommodate, 100 or more persons shall conform to the requirements of Chapter 55 (Theaters and Assembly Halls) of this code except that the minimum width of any exit doorway used exclusively by elementary school children may be 3 feet; but in any case the aggregate width of such doorways shall be in accordance with Chapter 55.

**Ind 56.14 Seats, desks and aisles.** (1) Seats, chairs and desks in class, recitation, or study rooms seating more than 50 persons shall be securely fastened to the floor; or seats shall be fastened together in groups of 4 or more, or in groups of 2 seats and 2 desks. Except that this requirement shall not apply to desks and chairs used by teachers, or to chairs, tables and equipment used in kindergarten rooms.

(2) Class, recitation and study rooms shall have aisles along all walls.

(3) In elementary school rooms, the intermediate aisles shall be not less than 18 inches and the wall aisles not less than 30 inches in width.

(4) In high school rooms, and in all other class, recitation and study rooms, the intermediate aisles shall be not less than 20 inches and wall aisles not less than 30 inches in width.

(5) Where rooms are used for assembly purposes, seats and aisles shall conform to the requirements of sections Ind 55.13-Ind 55.17 of this code.

**Ind 56.15 Heating plants.** (1) In every building more than one story in height, all heating plants and fuel rooms shall be enclosed with not less than 4-hour fire-resistive construction as specified in sections Ind 51.05 and Ind 51.06. All openings shall be protected with self-closing fire-resistive doors as specified in section Ind 51.09.

(2) In one story buildings all heating plants and fuel rooms shall be enclosed with not less than 2-hour fire-resistive construction as specified in sections Ind 51.05 and Ind 51.06, except that this requirement shall not apply to buildings where jacketed stoves or school room heaters are permitted. All openings shall be protected by self-closing fire-resistive doors as specified in section Ind 51.09.

**Ind 56.16 Sanitary equipment.** (1) **TOILETS.** School buildings shall have the following toilet equipment:

(a) In high schools, one water closet for every 30 females or fraction.

(b) One water closet for every 60 males or fraction and one urinal for every 30 males or fraction.

(c) In junior high and elementary schools, one water closet for every 25 females or fraction, one water closet for every 50 males or fraction and one urinal for every 25 males or fraction.

(2) **DRINKING WATER.** One drinking fountain shall be installed in each story and basement, for each 6000 square feet of classroom floor area, or fraction. Drinking fountains shall not be installed in toilet rooms.



(3) **WASHING FACILITIES.** Lavatories shall be provided in connection with toilet rooms in the ratio of one lavatory for every 60 persons of each sex in high schools and one lavatory for every 50 persons of each sex in junior high schools and elementary schools.

(4) **CLOAKROOMS AND WARDROBES.** In every school building, there shall be provisions for the placing and storage of the wraps of occupants. Such provisions shall consist of wardrobes, open front wardrobes, lockers or cloak rooms constructed and arranged in a manner to insure and facilitate the ventilation and sanitation of the contents. Ventilation shall conform to the provisions of section Ind 58.47 of the heating, ventilation and air conditioning code.

(a) This prohibits the use of corridors and vestibules for cloak room purposes unless ventilated lockers, wardrobes, or open front wardrobes are provided. Open hooks and hangers in the corridors will not be approved.

*Note:* Heating and ventilation. For heating and ventilation in schools, libraries, etc., see the heating, ventilation and air conditioning code issued by the industrial commission which code applies to all public buildings and places of employment.

*History:* 1-2-56: am. (2), (3), (4) and (4) (a). Register, September, 1959, No. 45, eff. 10-1-59.

**Ind 56.17 Artificial lighting.** (1) Each class, study or recitation room of standard size (31 to 33 feet long by 22 to 23 feet wide) shall be equipped with at least 6 artificial lighting units symmetrically spaced.

(2) Where electric service is available at least one circuit of 15 amperes capacity (see Wisconsin state electrical code) shall be supplied to each standard room.

*Note:* For general requirements which apply to the natural and artificial lighting of schools see the school lighting code issued by the industrial commission.

**Ind 56.18 Fire extinguishers.** In every building, standard fire extinguishers, as specified in section Ind 51.22, shall be provided in the proportion of one extinguisher to each 2500 square feet, or fraction, of floor area, but there shall be at least one fire extinguisher on each floor including basement. In addition to the fire extinguishers for general protection there shall be at least one extinguisher of appropriate type and size in each laboratory, shop or other vocational room. Every fire extinguisher shall be prominently exposed to view and always accessible.

**Ind 56.19 Fire alarms.** (1) Every building 2 or more stories in height and every one-story building with 6 or more classrooms and an assembly hall or gymnasium accommodating more than 100 persons shall be provided with a proper alarm system complying with section Ind 51.24. *Exception:*

(a) A hand operated alarm if permanently installed and so arranged that it can be operated from any story, including the basement, may be used in school buildings not more than 2 stories in height and having not more than 2 standard size classrooms on the second floor.



## Chapter Ind 57

APARTMENT BUILDINGS, HOTELS AND PLACES  
OF DETENTION

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**Ind 57.001 Scope.** (1) The requirements of this chapter shall apply to all apartment buildings, row houses, rooming houses, hotels, dormitories, convents, monasteries, hospitals, children's homes, homes for the aged and infirm, nursing homes, convalescent hospitals, convalescent homes, asylums, mental hospitals, jails, and other places of abode or detention, except as provided in section Ind 57.25 (2).

(2) By *place of abode* is meant a building or part of a building, such as apartment building, row house, rooming house, hotel, dormitory, convent, hospital, as follows:

(a) Occupied as a residence of 3 or more families living independently or occupied by 2 such families and used also for business purposes, or

(b) Occupied for sleeping or lodging purposes by 3 or more persons not members of the same family.

(3) By *place of detention* is meant a building or part of a building used as a place of abode and wherein persons are forcibly confined, such as asylums, mental hospitals, and jails.

*Note:* The attorney general has ruled that all persons committed to an insane asylum by court order come within the meaning of the words "forcibly confined". Also that the words "forcibly confined" apply to all persons confined without their consent.

**Ind 57.01 Class of construction.** (1) All places of abode which are more than 3 stories in height shall be of fire-resistive construction as specified in section Ind 51.001.

(2) All 3-story places of abode, other than hospitals and places of detention, shall be at least of ordinary construction as specified in section Ind 51.02, except that a 3-story apartment building which will accommodate not more than one family on each floor and a 3-story hotel or rooming house which will accommodate not more than 6 persons on each floor may be of frame construction as specified in section Ind 51.03, except as provided in section Ind 57.02.

(3) All places of detention shall be of fire-resistive construction throughout as specified in section Ind 51.001. All hospitals, convalescent hospitals, and nursing homes 3 or more stories in height shall be of fire-resistive construction as specified in section Ind 51.001.

**History:** 1-2-56; am. (3), Register, September, 1959, No. 45, eff. 10-1-59.

**Ind 57.02 First floor fire-resistive.** (1) In 3 story buildings, except those having not more than one family on each floor, the first floor and its supports shall be of not less than 3-hour fire-resistive construction as specified in section Ind 51.06, except that in a 3 story apartment house which will accommodate not more than 4 families, or a 3 story hotel or rooming house which will accommodate not more than 30 persons, above the first story, the basement ceiling shall be of not less than one-hour fire-resistive construction as specified in section Ind 51.06 or shall be protected by automatic sprinklers as specified in section Ind 51.23.

(2) Spaces between floor joists, below or above stud partitions where the studs extend through one or more stories, shall be fire-stopped.

**Ind 57.03 Garage and business separation.** (1) In every building in which a lower story is used for garage purposes, the ceiling over the garage shall be of unpierced 4-hour fire-resistive construction as specified in section Ind 51.06. Stairways from garages leading to the upper stories shall be separated from the garage area with walls of 4-hour fire-resistive construction as specified in section Ind 51.05, with openings protected as specified for special occupancy separation, section Ind 51.08.

(2) In a building more than 2 stories in height where the lower story is used for business purposes, other than the hazards listed in Chapter 57 of this code, the ceiling over the lower story shall be of not less than one-hour fire-resistive construction as specified in section Ind 51.06.

**Ind 57.04 Corridor and dividing partitions.** (1) All 3 story places of abode which have more than one apartment or 8 rooms on any floor, shall have the public passageways enclosed with partitions of not less than one-hour fire-resistive construction as specified in section Ind 51.05. If there is more than one apartment on any floor, such apartments shall be separated by such partitions. If there are more than 8 rooms on any floor, they shall be divided by such partitions into groups of not more than 8 rooms each.

(2) Doors in such corridor partitions may be solid slab doors, 1¾ inches in thickness, and need not be self-closing.

**Ind 57.05 Court walls.** The walls of courts and similar interior shafts for light and air shall be of not less than 3-hour fire-resistive construction as specified in section Ind 51.05, except that when the building is permitted to be of ordinary construction, the court walls may be of one-hour fire-resistive construction.

**Ind 57.06 Yards.** (1) Behind every apartment house, the rear of which does not abut on an alley or street, there shall be a yard across the entire width of the lot, open and unobstructed from the ground

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to the sky. The width of the yard behind a 2 story building shall be either:

- (a) At least 5 feet of unobstructed width; or
  - (b) At least 10 feet from the rear lot line to the building line, of which at least 3 feet shall be unobstructed, and the remainder may be occupied by an open (or screened) porch.
- (2) For apartment houses of more than 2 stories, the unobstructed width of the entire yard shall be increased one foot for each additional story, except in the case of corner lots.
- (3) No apartment house shall be placed behind any other building unless there is at least 50 feet between the buildings.

Ind 57.07 Number, location and type of exits. (1) There shall be at least 2 exits accessible from each room or apartment by means of stairways, ramps or horizontal exits. The number and location of such exits shall be such that in case any exit or passageway is blocked at any point, some other exit will still be accessible through public passageways from every room or apartment, except that in fire-resistive buildings a total area of not more than 1200 square feet may be placed between an exit and the end of the building, and except in 2 story buildings where there are not more than 2 apartments on the second floor, one exit may be through the adjoining apartment provided a connecting door containing a glass panel is provided in the partition separating the 2 apartments. The lock or locks on such doors shall be of a type which can be unlocked from either side without the use of a key.

(2) Exits shall be distributed so that the entrance to each room or apartment will be not more than 50 feet distant from an exit, measuring along public passageways, if in a building of non-fire-resistive construction, or 75 feet in a fire-resistive building.

(3) At least one-half of the required exits, in buildings of more than one story, shall be stairways as specified in section Ind 51.16. The remaining exits shall be either stairways, or horizontal exits; or fire escapes may be used as exits from floors which are not more than 40 feet above grade if they are placed against blank walls. Every building which accommodates more than one family, or 8 persons, above the second story shall have at least 2 stairways.

(4) Apartment buildings 3 stories or less in height whose floors and supporting members are of not less than 2-hour fire-resistive construction, as specified in section Ind 51.06, and which have a plan so arranged that not more than 2 occupancies on any floor make use of a common stairway, may be constructed with one common stairway as a single exit, provided the walls between occupancies and those enclosing the stairway are of 2-hour fire-resistive construction as specified in section Ind-51.05. In this case, the stairways must be of not less than 2-hour fire-resistive construction, must lead directly to the outside and have all interior openings protected by approved fire-resistive doors as specified in section Ind 51.09.

(5) Where a jail or other place of detention wherein persons are forcibly confined is located on the upper floors of a court house or office building, at least one of the exits from the jail shall be a

separate smokeproof stair tower leading directly from the jail section to the outside at street grade. This stairway shall serve only the jail area and there shall be no doors opening into it from the office or court house section of the building.

**Ind 57.08 Aggregate width of exits.** The aggregate width of exits shall be as provided for in section Ind 54.04.

**Ind 57.09 Exit doors.** Exit doors shall be as specified in section Ind 51.15; except that a door which is used by not more than 6 families, or 40 persons, shall be not less than 3 feet wide and shall not be required to open outward.

**Ind 57.10 Passageways.** Every public passageway leading from an exit shall be at least as wide as the required width of such exit. Every public passageway leading to an exit shall be at least 3 feet wide. The required width shall be kept clear and unobstructed at all times.

**Ind 57.11 Lighting of exits.** In every building which accommodates more than 4 families, or 30 persons, and in every building which accommodates transients, the public passageways and stairways and exit doors shall be illuminated from one hour after sunset to one hour before sunrise. This illumination shall include lights at all intersections of passageways, at all exits, and at the head, foot and landing of every stairway. The lights at emergency exit doors shall be red lights and shall be accompanied by a sign bearing the word "exit" or "out", in plain letters.

**Ind 57.12 Enclosure of stairways and shafts.** (1) In 3 story buildings all stairways shall be enclosed as provided in sections Ind 51.17 or Ind 51.18, with one-hour fire-resistive partitions, as specified in section Ind 51.05, or better, unless the building is either of fire-resistive construction or equipped throughout with automatic sprinklers. The doors may be omitted in the stories above the basement in one stairway enclosure. In all 3 story buildings accommodating more than 2 families, or 15 persons, above the first story, all basement stairways shall be enclosed with 2-hour fire-resistive partitions as specified in section Ind 51.05.

(2) In buildings more than 3 stories in height, all stairways shall be enclosed with 2-hour fire-resistive partitions, as specified in section Ind 51.05, except that one stairway may be unenclosed in the first and second stories, provided such stairway does not lead to the basement.

(3) In all buildings more than 2 stories in height in which the first story is used for business purposes, at least one stairway shall be enclosed in the first story with an unpierced wall of 2-hour fire-resistive construction, as specified in section Ind 51.05, and such stairway shall not connect with the basement.

(4) Every elevator shaftway, dumbwaiter shaftway, clothes chute, waste paper chute, pipe shafts and other similar vertical shafts in buildings more than 2 stories in height shall be enclosed with 2-hour fire-resistive partitions, as described in section Ind 51.05, except that for 3 story buildings, one-hour fire-resistive partitions may be used where the enclosure does not pass through a business portion. In all cases the basement enclosure shall be of not less than 4-hour fire-resistive construction.

**Ind 57.13 Toilet rooms.** (1) Every apartment shall have a water-closet in a bathroom or separate compartment, except that where there are apartments consisting of not more than 3 rooms, there shall be at least one water-closet for every 2 such apartments. All other buildings in this classification shall have at least one water-closet for every 10 persons or fraction thereof.

(2) Occupants of rooms with private water-closets shall not be considered in counting either the number of persons or the number of fixtures.

(3) Water-closets and urinals, and the pipes connected therewith, shall be protected against freezing as provided in section Ind 52.61.

**History:** (1) (2) (3) am. Register, June, 1956, No. 6, eff. 7-1-56.

**Ind 57.14 Washing facilities.** In every building of this classification where water supply is available or can be made available, there shall be at least one sink or wash bowl in connection with each toilet fixture. In apartment houses there shall be such a sink or wash bowl in each apartment.

**Ind 57.15 Repairs.** Every building of this classification, and all parts thereof, shall be kept in good repair and the roof shall be maintained to prevent leakage. All rainwater shall be so drained and conveyed therefrom to prevent dampness in the walls and ceilings.

**Ind 57.16 Cleanliness.** Every building shall be kept clean, and shall also be kept free from any accumulation of dirt, filth, rubbish, garbage, or other matter in or on the same or in the yards, courts, passages, areas or alleys connected with or belonging to the same.

**Ind 57.17 Size of rooms.** Every sleeping room shall be of sufficient size to afford at least 400 cubic feet of air space for each occupant over 12 years of age, and 200 cubic feet for each occupant under 12 years, except that a minimum of 150 cubic feet may be provided for infants in hospital nurseries. No greater number of occupants than the number thus established, shall be permitted in any such room.

**Ind 57.18 Basement rooms.** (1) No living or sleeping room shall have its floor level below the adjoining yard, court, alley or street grade.

(2) No rooms wherein persons are forcibly confined shall be located in a basement.

**Ind 57.19 Windows.** The outside windows in every sleeping or living room shall have a total sash area of at least 1/10th of the floor area of the room but not less than 12 square feet. The openable area of such windows shall be equal to not less than 5% of the floor area of the room served.

**History:** 1-2-56; r. and recr. Register, September, 1959, No. 45, eff. 10-1-59.

**Ind 57.20 Isolation of fire hazards.** (1) All boiler and furnace rooms, including fuel rooms and breeching, all laundries, drying rooms, carpenter shops, paint shops, and other hazardous work rooms and storage rooms in hospitals and buildings accommodating transients which are more than 3 stories in height and in all asylums and other places of detention shall be enclosed with a 4-hour fire-resistive enclosure as specified in sections Ind 51.05 and 51.06. All openings shall be pro-

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tected by self-closing fire-resistive doors as specified in section Ind 51.09.

(2) In all other buildings under this classification, such rooms shall be enclosed with a 2-hour fire-resistive enclosure as provided in sections Ind 51.05 and Ind 51.06, or better, except as otherwise provided in this section.

(3) In apartment buildings not more than 2 stories in height, such rooms shall be enclosed with a one-hour fire-resistive enclosure as specified in sections Ind 51.05 and Ind 51.06, or better, except as provided in subsection (5).

(4) In one-story buildings having a floor area of not more than 3,000 square feet and 2-story buildings having a floor area of not more than 1,500 square feet per floor which are used for business purposes and also accommodate not more than 2 families, such rooms shall be enclosed with a one-hour fire-resistive enclosure, as specified in sections Ind 51.05 and Ind 51.06, or better.

(5) The enclosure for the heating plant may be omitted in apartment buildings not more than 2 stories in height and having not more than 2 apartments on a floor and in rooming houses not more than 2 stories in height and having not more than 8 living or sleeping rooms on a floor, provided no part of the building is used for business purposes and all interior basement stairways are enclosed with a one-hour fire-resistive enclosure as specified in sections Ind 51.05 and Ind 51.06, or better. See section Ind 57.25 for exception for row house installations. *Exception:*

(a) Gas fired space heaters may be used in private apartments and in guest rooms in motels or tourist courts without an enclosure if approved by the industrial commission. Space heaters fired with liquid fuel may be used without an enclosure in motels and apartment buildings not more than one story in height.

*History:* 1-2-56; am. (1), Register, September, 1959, No. 45, eff. 10-1-59.

**Ind 57.21 Fire protection equipment.** (1) Standard first-aid standpipes shall be provided in every building which is more than 2 stories high and accommodates 20 or more transients, and in all hospitals, asylums and other places of detention.

(2) In the above buildings where adequate water supply is not available, and in buildings accommodating less than 20 transients where first-aid standpipes are not provided, a standard fire extinguisher shall be placed on each floor at the head of each stairway and at each elevator or group of elevators.

**Ind 57.22 Fire alarms.** (1) Every building which accommodates 20 or more persons except hospitals, places of detention, and motels not more than one story in height in which each unit has an outside door at grade level, shall be provided with a fire alarm system complying with section Ind 51.24.

(2) Every hospital which accommodates 20 or more persons shall be provided with a fire alarm complying with section Ind 51.24 except that chimes or other approved sounding devices shall be used when within hearing distance of the patients. Visual attention compelling devices may be used in hospitals where approved by the industrial commission.

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(a) A presignal fire alarm system may be installed in hospitals or hotels when not less than 4 employees are on duty at all times to respond to fire alarms.

(b) Where presignal systems are installed, it is recommended that the fire department be called immediately after the pre-alarm signal is received.

(3) This order applies to buildings now in existence and to buildings hereafter constructed.

**History:** 1-2-58; am. Register, October, 1958, No. 34, eff. 11-1-58.

**Ind 57.23 Scuttle.** Every building more than one story in height which accommodates more than 4 families, or 30 persons, shall have a permanent means of access to the roof from the inside. The opening shall be not less than 20 x 30 inches and there shall be a permanent ladder or stairway leading thereto.

**Ind 57.24 Directions for escape.** (1) In every room liable to be used by transients, a notice shall be conspicuously posted giving complete and plain directions for reaching at least 2 exits.

(2) In addition to this, a red exit light shall be provided over each exit on every floor.

**Ind 57.25 Row house.** (1) **DEFINITION.** A row house is a place of abode not more than 2 stories in height, arranged to accommodate 3 or more attached row dwelling units in which each dwelling unit is separated from the adjoining unit by an unpierced vertical occupancy separation of not less than one-hour fire-resistive construction, extending from the basement or lowest floor to the under side of the roof boards.

(2) **REQUIREMENTS.** (a) Each dwelling unit shall have separate entrances and exits leading directly to the outside.

(b) Heating ducts may be installed in the space between studs in the occupancy separation wall provided all such ducts are covered with ¼ inch corrugated asbestos or the equivalent protection. Heating ducts shall not be installed back to back in the occupancy separation wall.

(c) Where each living unit has a separate heating system, the requirements of sections Ind 57.20 and Ind 57.22 need not be complied with.

(d) Each living unit shall have access to the attic from the inside by means of an opening not less than 20 x 30 inches located above the stair landing on the second floor, but the other provisions of section Ind 57.23 need not be complied with.

### HAZARDOUS OCCUPANCIES

**Ind 57.50 Garages.** (1) **DEFINITIONS.** (a) A garage is a building, or part of a building, which accommodates or houses self-propelled vehicles. For the purpose of this code the term vehicle includes land, air and water vehicles.

(b) A private garage is one used in connection with a private residence for the purpose of housing self-propelled vehicles owned by the occupant of the residence and used only for personal or family service.

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(2) CONSTRUCTION REQUIREMENTS. (a) All garages, except private garages, which are more than 500 square feet in area shall have walls and roof of ordinary construction, as specified in section Ind 51.02, or better, and all floors of vehicle storage rooms, salesrooms, and repair shops shall be of not less than 4-hour fire-resistive construction, as specified in section Ind 51.06. *Exception:*

1. A garage not more than one story in height and 2,000 square feet in area may have walls and roof of frame construction if located at least 100 feet from any other building or boundary line between premises.

2. A hangar for the storage of not more than one airplane or a boat house for the storage of not more than one motor boat may be of frame construction if located at least 15 feet from any property line or other building.

(b) All walls, or parts of walls, nearer than 5 feet to a boundary line between premises or to any other building shall be unpierced; all walls, or parts of walls, nearer than 10 feet, but not nearer than 5 feet, to a boundary line between premises or to any other building shall have all openings therein protected by means of fire-resistive doors and windows as specified in sections Ind 51.09 and Ind 51.10.

(c) Where a garage which is more than 500 square feet in area is built in connection with a building used for other purposes, it shall be separated therefrom by means of 4-hour fire-resistive walls as specified in section Ind 51.05 and unpierced 4-hour fire-resistive floors above and below as specified in section Ind 51.06. All openings in the walls to adjoining parts of the building shall be protected by means of self-closing fire-resistive doors as specified in section Ind 51.09. Stairways from garages leading to upper stories shall be separated from the garage area with walls of 4-hour fire-resistive construction as specified in section Ind 51.05 with all openings protected by means of self-closing fire-resistive doors as specified in section Ind 51.09.

(d) Where a garage which is less than 500 square feet in area is built in connection with a public building or place of employment under this code, the garage shall have walls and ceiling of not less than one-hour fire-resistive construction as specified in sections Ind 51.05 and Ind 51.06, and the openings to adjoining parts of the building shall be protected by means of fire-resistive doors as specified in section Ind 51.09.

(3) FIRE PROTECTION. Boilers, furnaces and all open flame equipment within garages shall be effectively separated from other areas by not less than 2-hour fire-resistive walls, floors and ceilings as specified in sections Ind 51.05 and Ind 51.06. Such enclosures in basements shall have no openings into other basement areas. All stairways leading to such basement enclosures from the first floor shall be enclosed on the first floor with not less than 2-hour fire-resistive construction as specified in sections Ind 51.05 and Ind 51.06, and the opening thereto protected with a fire-resistive door as specified in section Ind 51.09.

(4) FLOOR PITS. There shall be no pits or other depressions in the floor of any garage area, except that this requirement shall not apply to the shallow depressions formed to secure floor drainage, nor

to catch basins installed in compliance with the provisions of the plumbing code issued by the state board of health nor to floor openings for access to regular basements.

(a) This will permit service openings in the floors of garages or service stations provided that the area below can be classed as regular basements and are ventilated in accordance with the requirements of the heating, ventilation and air conditioning code.

**History:** 1-2-56; r. and recr. (2) (c), Register, September, 1959, No. 45, eff. 10-1-59.

**Ind 57.51 Filling stations; buildings and structures. (1) DEFINITIONS.** (a) By filling station is meant one or more pumps, tanks, and other pieces of equipment used in the storage and dispensing of liquid fuels and arranged for the sale of such liquid fuels to the public.

(b) By dispensing area is meant any area within 15 feet of any pump or other dispensing equipment.

(c) By basement or open space under a floor or dispensing area is meant any space that does not have an outlet at its lowest level, at or above grade.

(2) **CONSTRUCTION.** (a) All buildings having a service space of more than 500 square feet in area, designed to accommodate motor driven vehicles, and all other buildings erected within 15 feet of the dispensing equipment shall be of ordinary construction as specified in section Ind 51.02, or better, except where canopies are provided over the dispensing equipment, such canopies shall be of incombustible construction throughout.

1. Pumps or other dispensing equipment serving liquid fuel to the public which are located within or under any occupied part of any building or structure shall be installed in compliance with the provisions of the flammable liquids code.

(b) Buildings not more than one story in height and not exceeding 500 square feet in area may be of frame construction if located at least 15 feet from dispensing equipment and 10 feet from the boundary lines between premises and from other buildings on the same premises.

(c) Buildings more than 500 square feet in area used as office buildings exclusively, or in connection with other non-hazardous occupancies may be of frame construction if not more than one story in height and located at least 30 feet from boundary lines between premises, from other buildings on the same premises and from the dispensing equipment.

(d) All walls, or parts of walls, in buildings under (a) which are nearer than 5 feet to a boundary line between premises or to any other building shall be unpierced; all walls, or parts of walls nearer than 10 feet, but not nearer than 5 feet, to a boundary line between premises or to any other building shall have all openings therein protected by means of fire-resistive doors and windows as specified in sections Ind 51.09 and Ind 51.10.

(e) The main floor level of any building erected within 15 feet of equipment used to dispense liquid fuel shall not be below the level of the driveway or grade at such equipment.

(f) There shall be no basement or other open space under the

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floor of the dispensing area outside of the building. There shall be no basement or other open space under the floor of any filling station building, unless:

1. The main floor level is at least 6 inches above the driveway or grade at the dispensing equipment, and
2. There is no outside door, window or other wall opening to such under floor space, except fuel chutes or other similar vertical openings having a tight-fitting cover, with the bottom of such opening at least 6 inches above the driveway or grade at the dispensing equipment.
3. The floor and enclosure of the under floor space is of 4-hour fire-resistive construction as specified in sections Ind 51.05 and Ind 51.06.
4. The under floor space is effectively vented by gravity means.

*Note:* For requirements applying to floor pits, see section Ind 57.50.

*History:* 1-2-56; am. (2) (a); cr. (2) (a) 1., Register, September, 1959, No. 45, eff. 10-1-59.

**Ind 57.52 Automobile tire or battery shops.** (1) Any building, or part of a building, in which tires are repaired or fitted to vehicles shall be constructed, equipped and maintained as a garage under section Ind 57.50.

(2) Any building or part of a building, in which electric storage batteries are charged, repaired, or are installed in vehicles shall be constructed, equipped and maintained as a garage under section Ind 57.50.

**Ind 57.53 Automobile parking decks.** (1) **DEFINITION.** For the purpose of this code, a parking deck is an unenclosed or partially enclosed structure used for the parking or storage of self-propelled vehicles, which are driven into the structure and are parked under their own power with no facilities for the repairing of such vehicles.

(2) **CONSTRUCTION REQUIREMENTS** (a) Parking decks may be erected without enclosing walls except that unpierced enclosing walls of not less than 2-hour fire-resistive construction, as specified in section Ind 51.05, shall be provided on all sides which are located less than 10 feet from the boundary line between premises or from any other building.

(b) Parking decks of 4-hour fire-resistive construction shall not be limited in height or in floor area.

(c) Parking decks more than 50 feet in height shall have floors and supporting members of 2-hour fire-resistive construction or better. Such structures shall not exceed 75 feet in height or 30,000 square feet in area.

(d) Parking decks of unprotected incombustible construction shall not exceed 50 feet in height or 20,000 square feet in area. This area may be increased to 25,000 square feet where the structure faces 2 streets and to 30,000 square feet where it faces 3 or more streets.

(e) A continuous wheel guard not less than 10 inches in height shall be provided on all sides of the structure on all floors.

(f) A guard rail not less than 3 feet 6 inches in height and having an intermediate rail at mid-height and a toeboard at least 6 inches

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high at the base, or the equivalent, shall be provided on all open sides of the structure on each floor.

(g) All parking decks and parts thereof shall be designed and constructed to support the following minimum superimposed live loads in pounds per square foot of horizontal area, in addition to the dead load:

	<i>Pounds Per Square Foot</i>
<i>Passenger Cars Only</i>	
Top floor -----	80
First floor -----	80
Intermediate floors -----	50
Ramps -----	80

*Busses and Trucks*

All floor and ramp areas ----- 8000 pound axle load in any possible position or 80 pounds per square foot, whichever produces the greater stress.

History: Cr. Register, June, 1956, No. 6, eff. 7-1-56; cr. (2) (g), Register, August, 1957, No. 20, eff. 9-1-57.

